Editorial: Combining the Science and Practice of Restoration Ecology—Case studies of a Grassroots Binational Restoration Collaborative in the Madrean Archipelago Ecoregion (2014-2019)

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ABSTRACT: The Sky Island Restoration Collaborative (SIRC) is a growing partnership between government agencies, nonprofit organizations, and private landowners in southeast Arizona, the United States, and northern Sonora, Mexico. Starting in 2014 as an experiment to cultivate restoration efforts by connecting people across vocations and nations, SIRC has evolved over 5 years into a flourishing landscape-restoration initiative. The group is founded on the concept of developing a restoration economy, where ecological and socioeconomic benefits are interconnected and complimentary. The variety of ideas, people, field sites, administration, and organizations promote learning and increase project success through iterative adaptive management, transparency, and sharing. The collaborative seeks to make restoration self-sustaining and improve quality of life for citizens living along the US-Mexico border. Research and experiments are developed between scientists and practitioners to test hypotheses, qualify procedures, and quantify impacts on shared projects. Simultaneously, partners encourage and facilitate connecting more people to the landscape—via volunteerism, internships, training, and mentoring. Through this history, SIRC's evolution is pioneering the integration of community and ecological restoration to protect biodiversity in the Madrean Archipelago Ecoregion. This editorial introduces SIRC as a unique opportunity for scientists and practitioners looking to engage in binational partnerships and segues into this special journal issue we have assembled that relates new findings in the field of restoration ecology.

RESUMEN: Sky Island Restoration Collaborative (SIRC) es una alianza en crecimiento entre agencias gubernamentales, organizaciones sin fines de lucro y propietarios privados del sureste de Arizona, EE. UU. y el norte de Sonora, México. Empezando en 2014 como un experimento para cultivar las iniciativas de restauración al conectar a las personas a través de vocaciones y naciones, SIRC ha evolucionado durante 5 años en una floreciente iniciativa de restauración del paisaje. El grupo se basa en el concepto de desarrollar una economía de restauración, donde los beneficios ecológicos y socioeconómicos están interconectados y se complementan. La variedad de ideas, personas, sitios de campo, administración y organizaciones promueven el aprendizaje y aumentan el éxito del proyecto a través de la gestión adaptativa iterativa, la transparencia y el intercambio. La colaboración busca hacer que la restauración sea autosuficiente y mejorar la calidad de vida de los ciudadanos que viven a lo largo de la frontera entre México y Estados Unidos. Los científicos y profesionales desarrollan investigaciones y experimentos para evaluar hipótesis, calificar procedimientos y cuantificar los impactos en proyectos compartidos.Simultáneamente, los colaboradores fomentan y facilitan la conexión de más personas al paisaje, a través del voluntariado, prácticas profesionales, capacitación y tutoría. A lo largo de su historia, la evolución de SIRC es pionera en la integración de la restauración comunitaria y ecológica para proteger la biodiversidad de la ecorregión del archipiélago Madrense. Este editorial presenta a SIRC como una oportunidad única para los científicos y practicantes que buscan participar en alianzas binacionales y transiciona a esta publicación especial de la revista que hemos recopilado que relaciona nuevos hallazgos en el campo de la ecología de la restauración.

KEYWORDS: Restoration economy, biodiversity, ecohydrology, environmental justice, stakeholders, community involvement, partnership, human-nature relationship

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Introduction

The disconnect between the science of restoration ecology and the practice of ecological restoration stymies the advancement of both.[1] Scientists studying ecological processes and watershed restoration are often out of touch with practical concerns and needs, while land managers and

Figure 1. Representatives from Cuenca Los Ojos (CLO), Borderlands Restoration Network (BRN), Sky Island Alliance (SIA), Western Land Alliance, Bat Conservation International, US Bureau of Land Management (BLM), US National Park Service (NPS), US Forest Service (USFS), US Geological Survey (USGS), US Bureau of Reclamation (BOR), US Fish and Wildlife Service (USFWS), Arizona Geological Survey (AZGS), Watershed Management Group (WMG), and private landowners at inaugural SIRC meeting (February 2014). SIRC indicates Sky Island Restoration Collaborative.

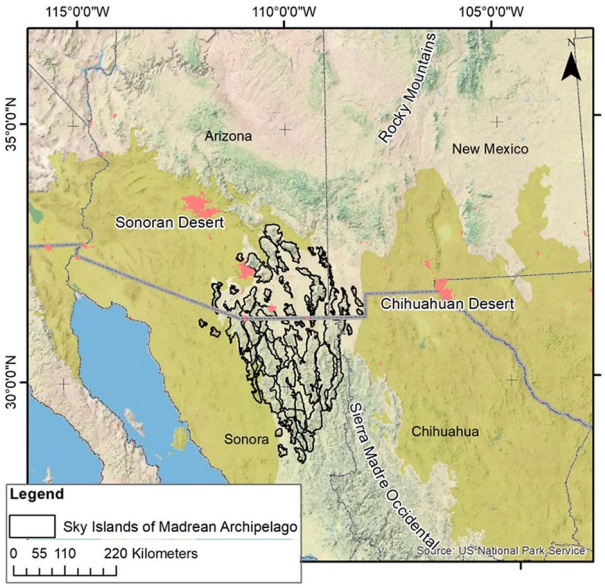

Figure 2. Madrean Archipelago Ecoregion's Sky Islands located on the US-Mexico border (map).

decision makers sometimes invest in approaches with little supporting scientific evidence or postimplementation monitoring and assessment. Combining the science and practice of restoration ecology can lead to improved science, management decisions, results, and public engagement and policy, while reducing costs. "Ecological restoration refers to the process of managing or assisting the recovery of an ecosystem that has been degraded, damaged or destroyed as a means of sustaining ecosystem resilience and conserving biodiversity."[2] Restoration practitioners are encouraged to consider complex interactions of abiotic and biotic factors as well as interactions of natural and managed processes for success of their projects. This complexity demands local knowledge and applications adapted to place.[3]

In 2013, a budget sequester cut spending across Federal agencies, as well as state and local governments and nongovernmental organizations. This motivated employees, collocated and interested in restoring the Madrean Archipelago Ecoregion (referred to as "the Madrean" hereafter), to pursue more collaborative approaches and maximize the impact of funding that was available. After several informal conversations, a meeting was held to formalize the Sky Island Restoration Collaborative (SIRC; Figure 1), a coalition of practitioners, scientists, and land managers (Figure 2). Our foundational relationships developed through regional events and conferences, with a shared geography and commitment of partners in a place-based emergent process.[3]

Our hypothesis was to combine resources and knowledge to improve restoration through activities, outcomes, and awareness, and nurture the importance of biodiversity for human well-being. In addition, SIRC laid the groundwork to demonstrate the value of a restoration economy by establishing an integrated but open network of people and financial systems that collaboratively recognize and respond to "biological wealth." This wealth is achieved by empowering people to earn their living by caring for the ecosystems that support them. In this spirit, we began to share ideas and results of previous work, and collaboratively document research needs.

The SIRC identified a set of shared visions to

1. restore and preserve hydrological and biological processes throughout entire watersheds, from the top of the mountains to the basins below;
2. maintain and respect the unique biological and cultural diversity found in the Madrean by working across borders, jurisdictions, and public and private boundaries;
3. help restore and build resilient natural and human communities based on restoration economies; and
4. address social inequities and improve quality of life in the Borderlands.

Palmer et al[4] document that globally, billions of dollars are spent on river restoration, with little postassessment or critical thinking about goals and objectives in scientific terms. They suggest that the broad restoration community, including funding agencies, practitioners, and citizen restoration groups, adopts criteria for defining and assessing ecological success in restoration, informed by the principles of uncertainty and adaptive management. To reach ecological success, it is important to address the many ecological unknowns such as the interaction of soils, geology, hydrology, slope, and biota, in addition to climate change impacts and thresholds. To that end, we are working to merge the science and practice of restoration of landscapes to promote ecological success, while acknowledging uncertainty. According to SIRC Annual Report tallies, we documented combined financial resources of over US$2 million per year, and this amount continues to grow (likely doubling), from numerous partners working together on shared projects to restore the Madrean.

The Convention on Biological Diversity (CBD) convenes the United Nations under a framework of cooperation for conservation of biological diversity, commitment to sustainable development, and the fair and equitable sharing of benefits. At the 16th CBD (2016), a Short-Term Action Plan on Ecosystem Restoration (STAPER)[2] was developed and endorsed by nearly all countries, including the United States and Mexico. The plan provides a framework around 4 main groups of activities for ecosystem restoration: (a) assessment of opportunities, (b) improving the institutional enabling environment, (c) planning and implementation, and (d) monitoring, evaluation, feedback, and disseminating results.

This editorial introduces SIRC efforts and case studies, portrayed using the STAPER framework for safeguarding biodiversity, restoring degraded ecosystems, improving ecosystem resilience, contributing to carbon stocks, and mitigating climate change, and with consideration to human well-being.[2] Successes and lessons learned of this collaboration offer a unique perspective for scientists and practitioners looking to engage in binational partnerships to improve degraded ecosystems.

Assessment of opportunities

The Madrean is a globally recognized rich and diverse ecosystem, spanning from the Sierra Madre Occidental to the south and the Rocky Mountains to the north, and bordering the Chihuahuan and Sonoran Deserts to the east and west, respectively (Figure 2).[5-8] There are 55 "Sky Island" mountain ranges, with elevations ranging from ~1600 to 3300 m, that are covered with pine and oak forests,[9] and surrounded by desert "seas" of valley grasslands or desert scrub.[6-8] The Madrean contains over 3000 plant species, over half of all species of birds found in North America, thousands of species of invertebrates, and 104 mammals including 29 bat species.[10,11] The Madrean is home to many threatened and endangered species including the only known wild jaguars and ocelots in the United States. In addition, there are nearly 100 species of reptiles and 25 native amphibians.

The Madrean is part of an area recognized by Conservation International as one of 36 recognized "biodiversity hotspots" in the world, defined as areas having a high percentage of plant life but has lost 70% of its original natural vegetation.[12] Human populations and associated development such as logging, fire (controlled burns and suppression), cattle grazing (and overgrazing), vehicle disturbance (road installations and off-road disturbance), groundwater pumping, and pollution have altered the natural processes. The physical environment of the Madrean has been forced to adapt to these changes by compromising the ecosystem services that the same human populations rely upon. The Madrean is of great biogeographical interest to researchers, managers, environmentalists, and other stakeholders within, and throughout the world, as evidenced by thousands of publications describing ecology, conservation management, and history.[5] Over the past 3 decades, 4 conferences have convened on the "Biodiversity and Management of the Madrean Archipelago," providing networking venues and opportunities for dissemination of research, with proceedings available from the US Forest Service (USFS), Rocky Mountain Research Station.[10,11,13] Human populations are influenced by the cultural and political diversity inherent to the international borderland setting.[6] Most citizens living on the US-Mexico border subsist on household and per capita incomes much lower than the state and national averages for the United States.[14] Like much of the world's poor populations living in low-income, rural areas, people living in the Madrean depend on ecosystems and related biodiversity for subsistence, security, and income.[12,15,16]

Ecological tipping points in the Madrean may be imminent, if not already passed, due to climate changes and various landscape disturbance.[17-19] There is a need for research and action that recognizes, addresses, and restores the biological integrity on both sides of the US-Mexico border.[5,20] The Madrean is a place where restoration would help conserve biodiversity, while including local people and stakeholders.[2]

A B

Figure 3. Photographs of students and interns working with SIRC: (A) a vegetation survey at gabion installed in Bone Creek, Deep Dirt Farm Institute, Patagonia, AZ, with partners from USGS, BRN, and NPS (2015); and (B) master's candidate presenting SIRC-supported research at the Water Resources Research Center Annual Conference, Tucson, AZ, 2016.[28] BRN indicates Borderlands Restoration Network; NPS, US National Park Service; SIRC, Sky Island Restoration Collaborative; USGS; US Geological Survey.

Restoration practitioners are challenged to continually modify and adapt their approaches to restoration by considering a greater diversity of restoration techniques, including broadening the suite of native plant species that are used. In this special issue, the paper by Campbell[21] describes a planting palette approach to support pollinators that leverages botanical species richness to assist pollinator conservation efforts in the uniquely biodiverse Sky Island region.

Wildfire is an important natural process affecting the distribution and condition of vegetation in the Madrean, but land management and land use have altered fire regimes in many places. In this issue, Laushman et al[22] describe growing wildfire risk along the US-Mexico border that has prompted widespread treatments to reduce hazardous fuel loads in recent decades. They review studies on wildfire risk and fuel treatments along the border from 1986 to 2019, to better understand the current science and identify knowledge gaps that can be addressed with new research.

Wildfire is further explored in this special issue by Villarreal et al,[23] who analyzed 32 years of fires in the Madrean mapped from satellite imagery,[24] and investigated how the location, frequency, and severity of recent fires compared with historical fire regimes across gradients in vegetation, land management, and climate. The authors identified areas and conditions where fire regimes are close to historical as well as those where restoration and fuel treatments could be prioritized.

Improving the enabling environment

The SIRC partners are deeply connected to the region and actively invest in training the next generation of restoration practitioners and scientists through a diversity of initiatives. The SIRC is building communities that make ecological restoration experiences part of young people's education and livelihoods.[25] Many youth, interns, and student workers have been hired through SIRC programs and work with a variety of mentors from SIRC organizations.

For example, Cuenca los Ojos (CLO) hosts high school students in Mexico to introduce them to desert wetlands, or *cienegas*, and the importance of restoration. College students from the University of Sonora, Hermosillo, Mexico, worked with Sky Island Alliance (SIA) to form the *Alianza Mariposa Monarca* (Monarch Butterfly Alliance) to survey and document the presence of monarchs and milkweeds and address gaps in knowledge about western monarch populations and pollinators in general.

Several SIRC partners have active internship programs in which student employees gain skills, earn a living wage, and are empowered to advance from crew members to team leaders to more skilled staff. Their success stories illustrate what is possible if resources are invested to effectively engage youth in ecological restoration.

Beginning with our first SIRC meeting, we identified a need for geospatially focused botanical work. The US Geological Survey (USGS) developed a position and hired a student from the University of Arizona, to work with the US National Park Service (NPS), SIA, and the USFS to categorize their rare plant database. We were able to develop monitoring protocols to track vegetation response to watershed restoration at a series of locations around the region using combined mentorship[26,27] (Figure 3A). This internship ultimately resulted in full-time employment with the USGS to expand the research using remote sensing and to publish those findings. Another graduate student at the University of Arizona approached USGS scientists seeking guidance on employing infiltration monitoring as part of an advanced degree in hydrology. Established partnerships offered the perfect "field laboratory" at the Babocomari Ranch, where the Walton Family Foundation provided funding to SIRC partners (Borderlands Restoration Network [BRN], USGS, Lacher Hydrological Consulting, and Watershed Management Group) to study and model surface-to-groundwater relations pertaining to gabion installation (Figure 3B).[28,29] The SIRC partners recognize the value of upcoming generations and have invested together to create strong foundations to support them.

Figure 4. Horticulturalists from Mexico and the United States exchange knowledge about milkweed propagation at an August workshop, 2015.

The SIRC has a growing pool of subscribers and volunteers that can now orchestrate a multidisciplinary agenda across a watershed, teaching practices to improve the health of watersheds and benefits to local communities. Volunteers collect native seeds, provide countless hours laboring at shared greenhouses, track wildlife, construct ponds, and move rocks. The education and ownership conveyed by such efforts build and sustain restoration products. Since 2014, the SIRC effort has focused on implementing projects with concurrent monitoring to measure success in connecting land management and science. The organizations in SIRC work to create a restoration economy to restore ecosystem function while improving social and economic benefits.[25] The SIRC began with approximately 26 people from 14 organizations in 2014. Over the course of 5 years, participation has quadrupled. Members have been promoted to leadership positions in their organizations and serve on boards of nonprofit and advocacy groups, including development of the Southwest Chapter of the Society for Ecological Restoration. These opportunities and advancements have broadened SIRC's impact across the southwestern United States and northern Mexico, and have elicited further interest from new collaborators.

In this special issue, Weaver[30] describes the Borderlands Earth Care Youth (BECY) Institute, a program run by the BRN, and hires culturally diverse youth (aged 15-18 years) living on the US-Mexico border to restore the binational watersheds. Attendees learn leadership skills, conduct hands-on restoration, and acquire marketable job skills restoring habitat in their home communities of Patagonia and Douglas, Arizona, the United States.[30] Through prolonged contact with restoration professionals across the SIRC, BECY has taken many steps forward to establish viable restoration-based economies in multiple underserved rural border communities, with the goal of catalyzing resilient movements of land stewardship for future generations.

Petrakis et al[31] document the use of a geographic information system (GIS)–based social value/ecosystem services tool, known as SolVES, for a watershed in southeastern Arizona. Inputs into the tool include social survey responses from residents of the watershed that identify locations of various social values as well as a collection of environmental variables. Results document increasing social value along streamlines and within conservation-based locations, and that life-sustaining services, biological diversity, and aesthetics were the respondents' highest rated social values.

Planning and implementation

One of the great synergies of SIRC is identifying shared needs across multiple projects and agencies and then working cooperatively to fill them with the community. Project proposals have a better chance of receiving funding when mutual interests are leveraged, and cost-sharing is

demonstrated. The "Interagency Botany Crew" is an example of what can be accomplished through SIRC cooperation. To correct for an identified lack of botanical skills across the Federal service locally, multiple agencies pooled funding to hire a 3-person crew to conduct field surveys for rare plants, vegetation monitoring, and native plant seed collection in summer months. It is a cost-effective way to hire skilled personnel needed to accomplish several high priority projects. In another example, several Federal, state, county, and local agencies; restoration organizations; and practitioners lacked appropriate native plant materials for their restoration projects. The operation of a native plant nursery, however, is a labor-intensive undertaking that requires highly skilled staff and substantial investments in infrastructure. In response, the Bureau of Land Management (BLM) and Borderlands Restoration collaborated with Native Seeds/SEARCH to refurbish a greenhouse on Native Seeds/SEARCH property and produced their first 10 000 native plants for restoration projects across the Madrean. Other Federal agencies including the USFS and NPS joined in the partnership accomplishing together what none of the agencies could do alone. The newly formed, Madrean Archipelago Plant Propagation (MAPP) center has agreements with these Federal agencies to collect specific native plant seeds and grow them out for agency restoration projects. MAPP has now expanded their offerings and are now going into local communities to offer native, pesticide-free plants not available from commercial growers but vital to local pollinators, helping create wildlife habitat across backyards throughout the region (Figure 4).

In this special issue, a paper by Manteca-Rodríguez et al[32] describes the Federal Highway 2 in Sonora, Mexico, that bisects the Madrean in half. Wildlife need to cross this roadway barrier to move across the landscape and thrive. This study analyzes the use of highway culverts as wildlife underpasses in two high conservation value sections of Highway 2.

The paper by Flesch and Esquer[33] explores efforts to restore and enhance riparian areas on various private and communal lands in northwestern Mexico, and uses bird communities and vegetation structure as indicators. Their efforts included erecting fencing and other structures and establishing management agreements for cool season grazing across 10 ranches that protect 475 ha of riparian areas. They found that understory vegetation and densities of some bird populations linked to this key limiting resource generally increased in treatments relative to controls, and they discuss several issues and ideas to improve future efforts in the region.

Monitoring, evaluation, feedback, and disseminating results

Monitoring activities are used to assess the efficacy and effects of implementing the ecosystem restoration plan and include socioeconomic costs and benefits. Managers and stakeholders can work together to implement findings via adaptive management, an iterative process of decision making with the goal to reduce uncertainty over time via monitoring. Finally, lessons learned should be shared in collaboration with stakeholders. The SIRC partners recognize the challenges of implementing restoration practice and are working to address some of the policies that might be underinformed. Often there is insufficient information, prerestoration and postrestoration, to assess impacts and provide quantitative science for land and water managers to utilize. Sometimes, restoration practices do not have the support of agency leaders due to outdated information and previous poor outcomes. There is often reluctance by state and Federal agencies to invest in restoration practices that they are not familiar with. Unbiased science and effective communication can provide results for decision makers to understand the benefits of various techniques and lead to policy change, and this is the strength of the collaborative SIRC approach.

A prime example of SIRC partners working together binationally is at San Bernardino National Wildlife Refuge in Arizona, the United States, and Rancho San Bernardino, just across the international boundary in Sonora, Mexico. The SIRC restoration practitioners from CLO and the US Fish and Wildlife Service have been building gabions and berms in the floodplain to restore the historic *cienega* and more than 8 miles of perennial flow to streams while creating habitat for native fishes and other aquatic species. The SIRC scientists from the USGS, BRN, University of Rochester (New York), and CLO analyzed and documented the positive impacts of these structures on vegetation health and water availability.[34,35] The strength and versatility of SIRC partnerships across administrative boundaries demonstrate the critical nature of ongoing work, and support monitoring and postassessment of the results of ecological restoration.

The SIRC initially started as a reporting collaborative. Brief summaries of activities, funds, and outcomes became a way for participants to start telling the collective story of the SIRC without incurring additional costs. It provided a highly productive way to collaborate without an infusion of funding to form a more formal partnership—allowing the cooperative to share their work with each other in brief and concise ways. This led to the identification of target areas for further project collaboration, cooperation, funding, and implementation. Shared reporting helped identify where we could leverage collective financial, staffing, and volunteer resources to accomplish larger projects with integrated natural resource goals across the landscape. During 2014-2016, the SIRC combined efforts to showcase the growing number of projects and successes via 2-page resource briefings, available both individually and collectively through the full annual report. These briefings described many of the SIRC cooperative projects, including inventory and monitoring, watershed modeling, on-the-ground restoration implementation, and long-term monitoring and research results.

Through publication in scientific journals, SIRC participants have shared knowledge gained through our restoration projects with a global community. Since the inception of SIRC, partnerships between scientists and practitioners and land managers have resulted in many presentations and in several publications. The effects of restoration on hydrology, geomorphology, and vegetation have been quantified and shared in SIRC publications, now being cited by scientists from Canada, Chile, Peru, China, Egypt, Italy, and Spain.

In this special issue, Callegary et al[36] describe using organic carbon (OC), total nitrogen content, and their stable isotope ratios to investigate Erosion Control Structure (ECS) potential for storing OC and nitrogen in two watersheds with similar geology, vegetation, and soils but different fire severity and ages of ECS. Higher amounts of OC and nitrogen were found in captured sediments in the watershed with higher burn severity and newer ECS. Extrapolation of results suggests a potential range of 117 to 147 metric tons/ha of ECS OC storage, and when this is scaled to forest ecosystems at the regional level (southwest United States), the result, 0.01 pg, is significant in terms of ecosystem services and regional efforts to promote carbon storage. These findings suggest installation of ECS significantly enhanced sequestration of nitrogen and carbon by capturing ash and char. The potential for restoration technology to influence the world's carbon markets is an aspiration for SIRC partners.

Finally, a review by Norman[37] describes rock detention structures (RDS) that have been in place for a very long time, based on archeological evidence. Numerous opinions about their use and effectiveness (both positive and negative) have been expressed but with little scientific evidence to validate many of these assumptions even though some research has been done in the past. The USGS Aridland study comprises a variety of scientific studies that have been undertaken to evaluate RDS from an ecological services perspective, which in turn has brought scientific clarity to many of the anecdotal opinions previously expressed. The author argues that global water availability may be a facet of the environment that is not yet adequately accounted for in economic terms and proposes the use of trade-offs between ecosystem services to safeguard ephemeral riparian areas (ie, to offset footprints of groundwater pumped downstream by investing in RDS facilities or to compensate professionals if RDS can be used to offset greenhouse gas emissions).

Conclusions

The benefits of working in the SIRC interagency, international partnership continue to develop. Intensive project planning between SIRC partners allows for application of natural sciences to understand and help address, manage, and solve real-time landscape issues. The SIRC unites all restoration practitioners, allowing the coordination and interweaving of a diverse array of objectives and institutional policies toward the realization of a common goal. The SIRC is helping scientists put their research into practice by working with land managers to implement scientific restoration practices, with quantifiable resource benefits and successful outcomes.

The human component and social network of the SIRC offers a new angle for landscape restoration. Restoration involves reducing impacts on the environment, while providing opportunities to secure community economic and social benefits. The SIRC is a diverse group of scientists, land managers, restoration practitioners, students, landowners, and residents. Our diversity of perspectives allows for the development of stronger, better informed, and synergistic approaches implemented at a variety of scales ranging from large watersheds to defined project areas to backyards. This creates fertile, productive ground, having a much bigger impact than 1 person, 1 organization, or 1 agency could have done alone. It has also provided a foundation to support stronger science applications, where values, interests, and needs intersect for sustainable land management. The social infrastructure, ways of interacting, and even the restoration toolbox are largely in place. Our challenge is to continue to work together to collect and expand scientific data to meet the needs of land managers, and to provide educational and outreach programs to "spread the word" and connect with new collaborators. The SIRC is part of an ongoing platform that encourages unique, nonprescriptive, socially, and ecologically responsive forms of participation in a regional restoration economy that is itself always under construction and in need of maintenance, and contributes to the increased global recognition of the importance of scientist-practitioner collaboration.

We invite readers to consider these SIRC stories as a guide for human interaction that helps develop scientific information to explain and perhaps predict impacts of our actions in the natural world. We encourage other groups, located especially in zones of high biodiversity, to come together for ecosystem restoration using the STAPER as a flexible framework.[2] In sharing our expertise, labor, funding, and common goals for the sustainability and resiliency of the ecosystem, we aspire for a better today and future. Through continued collaborative effort, SIRC has set an example for how science, people, and management can combine to increase the effectiveness of otherwise individual efforts. Results of these partnerships are changing policy and practice, and quantifiable successes can be used to encourage future investments. Practices established to promote local water resources and restore natural resources have the potential to create a restoration economy including for-profit industries that invest in living-wage jobs and sustainable use of natural resources. The SIRC is expanding our ability to assess and even predict the impacts of our actions on the natural world, and thus increase our ability to sustainably live, work, and thrive in our unique environments.

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Author Contributions

LMN, HRP, MMG, SMB, LM, DS, CC, JBC, DJT, NRW, DH, JAC, and AVAC conceived and supported the partnership, developed annual reports, participated in meetings, contributed science or restoration practices, and promoted the efforts. All authors contributed to writing the paper.

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Supplemental Material

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