



# Reimagining Great Lakes Water Systems

## Experts Workshop

April 13-14, 2016

### Background and Purpose

In April 2016, the Fund gathered 11 experts to give advice on what kind of project activity could help catalyze fundamental changes in how water moves in the Great Lakes basin, what moves in that water, and what moves on that water. The group explored the nature of the water system(s) in the basin, discussed where one could intervene to change the character of those systems, described traits of desirable Fund-supported project activity and advised the Fund on next steps to take and missteps to be avoided.

*The following synopsis is intended to capture the spirit of the roundtable discussions in summary form, and is not a complete transcript of the proceedings. Unless consensus is explicitly noted, this document should not be read to imply the endorsement of the contents by all of the individuals present. The Fund deeply appreciates the participation of the experts not only at the meeting, but in preparation and post-meeting follow-up as well.*

The meeting began with introductions, followed by roundtable-style facilitated conversations. Attendees are listed in Attachment 1. The agenda is included as Attachment 2. The attendees had also reviewed a working paper, drafted by Fund staff in consultation with some 30 experts, and other background material in advance of this roundtable. Attachment 3 includes the working paper and links to other documents.

**The Great Lakes Region is ready for a new generation of water systems.** As we have fashioned the land around us, we have changed the water systems of the Great Lakes. Attendees noted that no part of the hydrologic cycle is unaffected by humans. Rain carries pollutants from distant places. Farm chemicals from Iowa pollute Lake Superior. Toxic air emissions from across North America contaminate Lake Ontario. Within our cities, natural water systems—wetlands, streams, and even groundwater—have been replaced with manmade pipes, sewers, and storage basins. Even in places that seem natural, like rural areas, the patterns of water movements in streams are as altered as in urban areas. Rural areas, particularly those areas with intense row crop agriculture, are drained by field tiles (and public drains) that replicate the function of storm sewers in urban areas—moving water away from the land as quickly as possible after the raindrops fall.

These changes have made our land productive, our cities attractive, and our region attractive to water intensive industry. These changes were led, and—in general—are maintained by groups of specialists: civil and environmental engineers, licensed operators, specialized land improvement contractors, elected officials. There are entrenched cultures, rules-of-thumb, and ways of doing business that reinforce the status quo. Basin residents have enjoyed, and come to expect, the benefits of our current, even if somewhat altered, water systems.



Yet, the region's water systems are not ready for the new demands they are now beginning to face. Heavier rains are the “new normal,” as are the run-off related problems of harmful algae blooms, closed beaches and degraded water quality. Some of our built water infrastructure—such as public water supplies in some older urban areas—is too large; other parts—like the drainage systems in those same urban areas—are too small. Other parts of the water system, such as rural drainage networks, are struggling to move water off of fields fast enough and can be a pathway for nutrient and sediments to enter the Lakes. Sewer, water and drainage rates cannot support the require maintenance and new capital expenses many managers feel are necessary. Many citizens cannot afford those current rates.

The Great Lakes Region, which led the way in building the last generation of water systems, needs to lead again.

**Changes to our current water systems must speak to, shape, and be shaped by, the multiple values that water provides.** Yet, not all of our water values are aligned. Presently, some of the social norms that drive important water choices—engineering and regulatory heuristics such as designing to historic storms, farmers' preferences for high yields over high profits, a pollution-orientation in government programs (as opposed to biological and hydrological outcomes), and the general perception, especially among those in the water profession, that water services should be invisible—can limit how, and how quickly, our water systems adapt to new uses, new users and a changing climate.

The region, and the US more generally, are full of legacy water institutions and rules crafted for a different era. The top-down, command and control scheme in urban and industrial settings has been matched by a top-down, negotiate and subsidize scheme in rural settings. Both schemes have delivered impressive results based on driving adoption of approaches that were usually well established. The sense of the attendees is that such a legacy can limit the “permission-free” innovation now needed in our water systems. Institutions operate in silos. Water supplies are managed separately from wastewater treatment. Urban water is managed separately from the headwaters in rural areas. The people that benefit from them do not understand the language of water systems. That language is a mix of engineering and regulatory shorthand. Unit processes dominate this language not the values of the region's citizens.

Change will come from collaborative efforts that include new voices, new actors and new ideas. Project teams will need to “speak multiple languages and target multiple values.” Attendees identified under-appreciated values such as jobs in urban areas, “found revenue”, quality of life, improved farm profitability, and entrepreneurial opportunity tied closely to water. Attendees advised the Fund that patience, persistence and repetition are needed to drive the next generation of water systems in the basin.

**The Fund could launch and sustain an innovation ecosystem to speed the transition.** Attendees advised a focus on working in places and actually changing water systems (at a small scale) as the core of an innovation ecosystem. This pilot work should be supplemented with support for this emerging community of practice: such as periodic workshops to exchange lessons; targeted support for marketing, outreach and storytelling; and other services.

“Re-plumb watersheds! Do something! Explore what's possible.” as one expert put it. This is completely consistent with advice from expert interviews conducted ahead of this workshop. Attendees suggested that testing interventions in real places could differentiate the Fund from others who have been working



on the future of water utilities, green infrastructure and urban water systems. Pilots should be designed to prove concepts, and take the risk out of trying new ideas. Work should occur in both urban and rural landscapes. Pilot work should also be catalytic—designed to drive systemic change, illustrate the power of working with nature and the landscape, and include a path to the next set of interventions/scale.

Over the two workshop days, attendees offered various ideas about what might be piloted. Those ideas included:

- Work focused on improving soil health in rural areas. A one percent increase in soil organic carbon increases water storage enough to hold an additional inch of precipitation. A team, or teams, could test how to deliver soil health improvements in a catchment.
- A team could design a Great Lakes benefit fund, like Calvert Foundation’s Social Investment Notes that underlie the recently launched Benefit Chicago initiative. Investors could support a pool of revenue-generating projects, and receive a sub-market interest rate. The pool of projects, in turn, could include efforts to test new water system strategies such as vacant lot redevelopment, native plant nursery and landscaping business to service green infrastructure projects, and other water infrastructure work.
- A team, or teams could create water-focused eco-districts to explore how to solve local water and sewer problems at the sub-city scale. Teams could test how landscape/bio-mimicry can be applied, tested, and financed at a small scale.
- Drainage districts, county engineers, and others that manage rural drain networks could pilot how to provide ecosystem services like reduced nutrient or sediment run-off.
- Efforts like open-storm.org or AquaHacking could be expanded to showcase water-related opportunities for information technologists.
- A collaborative of community foundations could advance local water projects, raise water literacy, and/or pool their endowment investments in regional water projects that produce a return.

Throughout these conversations attendees advised, “There are no silver bullets.” More important to the workshop attendees than exactly what would be piloted, were the key traits of the pilot projects themselves. Pilot work is important because the future will be created in the doing of things, not in the abstract. The power of any pilot is related to the new actors engaged, how well the team moves beyond “traditional” experts, the degree to which the strategies are tied to how water moves in the landscape, and how the team integrates not only traditionally separated water services but the people they serve as well.

Attendees also advised that the Fund should stay focused on work that is catalytic—driving systemic changes, as opposed to supporting more incremental, place-by-place initiatives to solve purely local challenges. The group challenged the Fund to embrace, and where possible harness, the complexity of working on water systems. “Water is dendritic—touching many things,” commented one expert. Look for pilots that take advantage of those connections, where water can be “a source of generative wealth” like new kinds of employment, technological innovation or cost savings.



Members of the group also strongly recommended that the Fund to avoid overly complicated solutions. “Design for simple repeatability. Use simple, conservative metrics”, advised one expert. Another recommended, “Don’t let the perfect be the enemy of the good.”

Pilot projects can provide examples of what our next generation water systems should do, but they are stronger if they are connected in a community of practitioners who are working together. The key barriers faced in any pilot are human. Those driving change will be more effective if they have allies, trusted colleagues and a “safe space” to collaborate and exchange lessons. “Build and sustain” a practitioner’s network, advised one attendee. Create a capacity for teams to “over communicate” with one another. Support for services like story-telling, community engagement, and marketing might be more efficiently provided to a set of teams.

**The Fund should find and invest in new talent.** In our discussions, experts recommended that the Fund look for individuals that cross boundaries—of disciplines, institutions, and communities. Attendees repeatedly emphasized the need to go beyond “the environmental community and traditional approaches” and engage citizen groups in urban areas; farmers, their suppliers and customers in rural areas; and seek to blend the urban and rural in a watershed framework. The Fund should also seek to engage new networks, such as the emerging community of social entrepreneurs, to find leaders, energy and new ideas. Project teams, others advised, should include state and local government innovators.

One attendee suggested considering a “talent first” approach and ask for nominations or volunteers to lead teams. Incubate the people first, then an idea, and then fund a project.

Another expert offered, “The best innovators do not have time to read or respond to an rfp.” Good old-fashioned networking is what is needed to reach these people.

A challenge will be to build teams that include skills to get at the “underlying value sets, cultural themes and historical factors” so that they have the best chance at creating lasting systemic impact. In the words of one expert, “People and water are bound together. Use that!”

Throughout the discussions, the power of collaborative teams was emphasized. Few people possess all of the skills needed to undertake transformative work.

## Conclusion

This experts’ workshop was convened to discuss opportunities to drive positive ecological change by re-imagining the water systems of the Great Lakes basin. Eleven experts engaged in lively, energetic and wide-ranging conversation about the traits of projects that can demonstrate the benefits of new ways of managing water in the basin. Unlike most workshops on this topic, this gathering included experts from both urban and rural settings.

The time appears ripe to shift the systems that move water, move things in water and move things on water toward more integrated, more efficient, better funded, and more adaptable operations. This will not succeed if such designs are imposed from on high. Such a transition should begin with thoughtful experiments. The Fund is positioned to launch an “innovation ecosystem” of such experiments.



Experts advise that the centerpiece of such an ecosystem is “trying things”—piloting new strategies and behaviors in actual places. In this gathering, experts were less concerned with specific interventions, than they were with identifying the traits of interventions that could drive large-scale change. These traits include:

- working across the traditional siloes of water management (supply, drainage, waste treatment);
- successfully engaging non-traditional partners: local community members, new work forces, suppliers and customers (in rural settings);
- tapping into the values, cultures, and historic factors that define peoples relationship to water;
- finding new talent to work in the water space;
- design with the natural landscape and other “master variables”; and,
- designing for scale—simple, repeatable strategies, with an embedded strategy for regional impact.

The Fund was advised that it should place a premium on the talent of the teams supported. Experts strongly recommend going beyond the “usual suspects” in recruiting teams and project ideas. Experts also advised going beyond a traditional request for proposals as these ideas are fundamentally creative, and will require networking to attract the best teams.

Attendees suggest that the Fund be patient, and invest for the long haul. Pilot projects will be considerable stronger, if there is also parallel investment in a support network for teams.

Last, the Fund was advised to watch for, and avoid, group think, or as one advisor put it, “the bookclub mentality” of funding what every other funder supports. While there is potential for funder collaboration, the Fund’s success is in supporting the doing of things. This niche remains remarkably open.



**Reimagining Great Lakes Water Systems Workshop**  
**Hilton Orrington – Rogers Room, 9<sup>th</sup> Floor - Evanston, IL**  
**April 13-14, 2016**

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**Reimagining Great Lakes Water Systems Workshop**  
**Hilton Orrington – Rogers Room, 9<sup>th</sup> Floor – Evanston, IL**  
**April 13-14, 2016**

Meeting Goal: Identify programming opportunities that will help the region reimagine its water systems.

Advance Materials:

- Working Paper
- Draft Agenda
- Attendees List

**Wednesday, April 13 12:00 pm – 5:00 pm**

<b>Time</b>	<b>Description</b>
12:00 – 1:00	<b>Lunch</b> Rogers Room, 9 <sup>th</sup> floor
1:00 – 1:15	<b>Welcome and Introductions (Van Herik, All)</b> <ul style="list-style-type: none"><li>• Agenda review</li></ul>
1:15 – 1:45	<b>Ground Rules (Rankin)</b> <ul style="list-style-type: none"><li>• Meeting purpose and expectations</li><li>• GLPF background</li></ul>
1:45 – 3:00	<b>Water Systems</b> <ul style="list-style-type: none"><li>• What it is/they are</li><li>• What isn't working</li><li>• Why</li></ul>
3:00 – 3:15	<b>Break</b>
3:15 – 4:00	<b>Opportunities</b> <ul style="list-style-type: none"><li>• Where and how to intervene</li></ul>
4:00 – 5:00	<b>Traits</b> <ul style="list-style-type: none"><li>• What makes an intervention great?</li></ul>

**Dinner at Tapas Barcelona 6:00 pm**  
**(meet in the lobby at 5:50 pm for a short walk there)**



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**April 13-14, 2016**

**Thursday, April 14 8:00 am – 12:00 pm**

<b>Time</b>	<b>Description</b>
8:00 – 9:00	<b>Breakfast</b> Rogers Room, 9 <sup>th</sup> floor
9:00 – 10:00	<b>Project Ideas</b> <ul style="list-style-type: none"><li>• What should we try?</li></ul>
10:00 – 11:00	<b>Project Teams</b> <ul style="list-style-type: none"><li>• Who should be included?</li><li>• Where will we find them?</li></ul>
11:00 – 12:00	<b>Wrap up</b> <ul style="list-style-type: none"><li>• What must we do?</li><li>• What must we not do?</li><li>• What will be best to do?</li></ul>



# Memorandum

**Date:** April 7, 2016  
**To:** Water Systems Workshop Attendees  
**From:** David Rankin  
**Re:** Background Materials

Thanks to all of you for attending our upcoming workshop. I've attached a few background items: a list of who we expect to attend, a background paper on the issues we'll be discussing, the agenda for our time together, and a map showing where we're meeting—and where we'll be having dinner. Dress comfortably, perhaps in layers, and no more formally than business casual.

We've decided to keep the homework reading light. Please review the background document and think about three ideas in advance of our get together.

- First, come with a “one water” story—ideally based on your experience—that shows how water transcends institutional and disciplinary boundaries.
- Second, think about what changes in how we manage likely matter the most—the high leverage opportunities to unlock ecological, community and economic value.
- Last, and this is the most important homework, come with an idea for a specific action that should be tested—something that can be tried and catalyze big changes if successful, or will change how we think about water systems even if the actions don't produce what's expected.

Please do not invest too much time in refining your ideas, and for heaven's sake do not create documents or slide decks. This “thinking” is designed to prime the pump.

As you can see on the attached agenda, this workshop is designed to be an extended conversation. You were invited because you have deep expertise and a track record of making big things happen. Not coincidentally, most of you have diverse professional histories, and ways of seeing opportunity where most see problems. We look forward to your perspectives and insights!

For those of you who want to over-prepare, you might give these short articles a look. None of them deal with water. All of them deal with creative problem solving and new ways to spot opportunities.

Meta-structure versus infrastructure

<http://www.wired.com/2016/01/the-metastructure-transportation/>

What business are we really in (OK, at 13 pages, this isn't that short) <http://glpf.org/wp/wp-content/uploads/2016/04/MktgMyopia.pdf>

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## The Myth of the Lone Genius Innovator

<https://hbr.org/2016/04/its-time-to-bury-the-idea-of-the-lone-genius-innovator>

I look forward to seeing you all next week. Please call or e-mail with questions.

David

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**Reimagining Great Lakes Water Systems<sup>1</sup>**  
*Working Draft- version 4.3*  
*April 2016*

**Introduction**

“Water systems” are the things that affect how water moves, what moves in water, and what moves on water. Those things can be reimagined, rebuilt, removed and/or reconfigured in the Great Lakes region. Water systems are far more than just our constructed infrastructure of pipes, pumps and tanks, green infrastructure, rural drainage systems, and port and river mouth developments. The scope of water systems includes natural landscapes, and anything else that affects water—such as design standards and specifications, operating rules (e.g., SCADA systems; asset management systems; accounting systems; revenue streams; capital structures; underwriting practices; local, state and provincial rules that govern utilities and land use), supply chains, as well as institutional frameworks, contractual arrangements and even belief systems that shape and drive our individual and shared relationships with water.

The Great Lakes Protection Fund recently concluded a consultant-led [enquiry](#) (232kb pdf) that asked Great Lakes leaders and other experts to identify top-tier issues that demand new system-smart strategies. Fifty-one individual interviews were conducted. Five top-tier issues were identified. They include: **a changing climate, deteriorating and outdated water infrastructure, nutrient pollution, demographic and business shifts in the Great Lakes Region, and aquatic invasive species**. While these issues include threats to the ecological integrity to the Lakes, more importantly, they represent a massive opportunity to build the future we want here.

These issues are integrated and inter-connected. For example, interviewees expressed concern that our current water systems cannot handle higher intensity rainfall, a consequence of which will be stream flows and run-off that will deliver higher flows with more sediment and more nutrients to streams, rivers and lakes, further stressing the Lakes that have been made more sensitive to pollution by invasive species. That stress will lead to conditions that impact not only the Lakes’ ecological systems, but also affect the health of populations that use our Lakes, and the region’s economy.

The Fund seeks to support a portfolio of projects that develop and test elements of new generation water systems,<sup>2</sup> reimagined frameworks, relationships, strategies, financing, technologies, and institutional arrangements. New generation water systems will enable the management of water in ways that can work with changing precipitation patterns and economic and demographic patterns while improving ecological health, generating economic value, and providing an expanded set of social goods to watershed residents.

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<sup>1</sup> “Water Systems” is a working title. As described in the first paragraph, it’s bigger than built infrastructure, bigger than public water supplies. It is meant to involve systems thinking – about water. If that doesn’t resonate, we welcome suggestions for another phrase that captures our intent.

<sup>2</sup> “Water systems” solutions seem the best way to tackle the priority issue. Solutions should address as many issues as possible; the problems should not become new silos or programmatic areas. Does this approach make sense?

At this point in our process, the Fund welcomes expert advice about where opportunities exist (or could exist), what to avoid, and who to engage as we solicit project ideas.

### **Redefining, Reinventing, and Reinvesting in Water Systems**

Our existing water systems are ill suited for the more frequent and extreme rain events resulting from climate change. The amount of rain falling in large storms has increased 37-71% across the Great Lakes region. Regular flooding in cities, increased nutrient run-off from agricultural areas, harmful algal blooms, beach closures, and deteriorating stream health demonstrate that our existing systems are not working. A next generation approach must be more robust and resilient.

Further, the institutions that provide drinking water, treat sewage, maintain storm sewers, and service drainage ditches in rural settings, among others, are largely a legacy of past circumstances and may have difficulty meeting the needs of the environment and populations they now serve. These institutions emerged in an era of abundant federal subsidies, a tightly focused and prescriptive regulatory environment, and were designed to solve discrete, well-defined and understood problems. They have largely been successful at addressing their original goals, but our circumstances have changed.

Last, the region has not reinvested in its existing traditional infrastructure. For example, the EPA estimated that there were \$23 billion dollars of waste and storm water infrastructure needs on just the US side of the Great Lakes Region in 2008 (2008 dollars). Estimates were updated in January 2016, identifying \$77.4 billion in need for Region's states (2012 dollars), but have not yet been broken out for the basin specifically.<sup>3</sup> This is an enormous challenge. However, it also presents a tremendous opportunity to reimagine the type of built infrastructure that would best serve our region for decades to come, including how it can be capitalized, operated, maintained, retrofitted, repurposed and managed.

In short, the state, scale, scope and inter-relationships of our existing water systems are not up to the job of restoring and maintaining ecosystem health; our institutions are not positioned to function well as climate, demographics and economic systems change; and the entire system is undercapitalized. Our region needs to raise and better use money, reform our institutions and redefine what they do and how they do it.

This transformation will not, and should not, happen quickly. It will not result from a grand design imposed from some central authority. The scope and scale of changes that are necessary require us to think expansively and lead us to resist working within the institutional frameworks and "siloes" that have created and maintained these problems (e.g., urban versus rural, drinking water versus wastewater). The Fund's interest is to strengthen and build upon communities of practice that question our existing water systems, and that engage in prototyping, piloting and refining the elements of a new water system practices. These practices can include new strategies, new business models (including new revenues, different capital structures and new governance approaches), new institutional structures and the new technologies to support them.

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<sup>3</sup> Chronic underinvestment is a problem and opportunity. New investments are needed, but how those costs are covered/recovered are critical to the region's future. We're looking for the information needed to sketch the magnitude of the problem, and for advice how to frame the search image for creative solutions.

### **What do we hope to accomplish in the long run?**

We hope to see new institutional frameworks and arrangements—in both the public and private sectors—that continue to improve ecosystem health, are resilient to changing conditions, and pay for themselves by sharing in the wealth they help create. We do not know, nor can we know, the precise form of these new frameworks and arrangements. In fact, their greatest strength will likely be found in their ability to be highly adaptive and dynamic by nature. These institutions will have features not found in today’s water institutions. They will likely be in a different business altogether—such as connecting non-riparians to riparian or public trust rights and responsibilities. They will finance their work differently, not relying on massive external subsidies, or deferring needed maintenance. They may operate on a watershed basis. They will increasingly rely on distributed approaches and technologies. They will be driven by in-stream or in-lake feedback as much as (and perhaps more than) traditional regulatory targets. They will be well-networked, and be increasingly inter-dependent.

### **How will we get there?**

We expect to finance teams that develop, test, and begin to scale specific elements of new water systems. We want teams to undertake specific actions that will catalyze the changes that are needed. Our vision is to work from the specific to the general, and we are interested in testing new business and operating models.

The Fund welcomes further expert advice on the kinds of prototypes and pilot efforts and, as important, the traits of projects that will hold promise in reimagining our water systems. We expect that some of these investments will result in successful prototypes that disrupt our current water system and catalyze systemic change, while other investments will serve as learning, teaching and clarifying opportunities.

Our expectation is to make a multi-year commitment to this programming as it supports the Governors’ shared priorities.

### **What we’ve heard so far**

Over the last two months, Fund staff has conducted some 30 interviews with experts on this topic. These interviews have given us deeper appreciation for the issues in play, helped us focus our thinking, and identified some drivers to keep in mind. Even though the interviewees have come from diverse backgrounds, offered their own perspectives, and did not always agree with one another, a number of themes consistently emerged from those consultations.

Experts consistently advised the Fund to:

Keep a systems focus. The issue is much bigger than the pipes, tanks and pumps that comprise the “built” infrastructure in the water space. Good work will target the systems that surround water infrastructure. Such systems include: financing; the consulting sector; the urban and rural communities that own, operate and pay for these systems; the public and private policy frameworks in play; and the professions that design, build and operate these systems.

Do things. The water systems space is crowded with institutions providing analysis, advice, opinion and prescriptions. There is a critical need to try genuinely new approaches in real places. “Small pilots are worth more than big studies,” according to one nationally recognized expert.

Bust siloes. Work across traditional boundaries of drinking water, sewage treatment and storm water/drainage management. Do not fall into traps of working in traditional spaces and reinforcing them.

Focus, but... Consider choosing a focus area or areas that narrow the scope of ideas you receive and fund, but be careful not to reinforce current siloes. “Water” is too big. “Systems” is too general. Find a way to communicate high impact areas, traits of work likely to be successful, and the Fund’s interests crisply.

Keep this about people. Support and grow leaders. Encourage new behaviors, new approaches, and new ways of delivering value. At the end of the day, change occurs because people do it. This may involve but is not about mostly technology, finance or business models—it’s about cultivating and rewarding leadership.

### **What’s next?**

We expect to support a new set of multi-year projects beginning in late 2016. We expect to release a project solicitation of some kind in May. We hope and expect those projects to add value to our [existing portfolio](#) (61 kb pdf).

Your advice is extremely important. We want your help to identify leaders, better understand intervention points, and learn about what practices, strategies, and technologies might actually catalyze the changes we need. We want to better understand how much ecological improvement opportunity exists. We want to learn more about how change happens in risk-averse and fragmented sectors like water management.<sup>4</sup> We also hope to reality test whether this space is suitable for a relatively small funder using a disruptive or catalytic change strategy.

### About the Great Lakes Protection Fund

The Fund is the nation’s first ecosystem endowment. It was created by the Governors of the Great Lakes States in 1989. The Fund’s mission is to identify, demonstrate and promote regional action to improve the health of the Great Lakes Basin ecosystem. We provide financial support to teams that undertake collaborative projects in support of that mission. The Fund makes grants, issues debt and can take equity positions in those projects. The Fund does not support lobbying, litigation, advocacy, public works projects, or compliance obligations. The Fund has invested over \$75 million in 265 projects, involving over 1000 collaborating institutions, to accomplish our mission. More at <http://www.glpf.org>

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<sup>4</sup> This might require long-term investments in people and “safe spaces” to innovate. We need advice and counsel here.