The State of Public Sector GSI, 2022

... and Its Aftermath

March 6, 2025
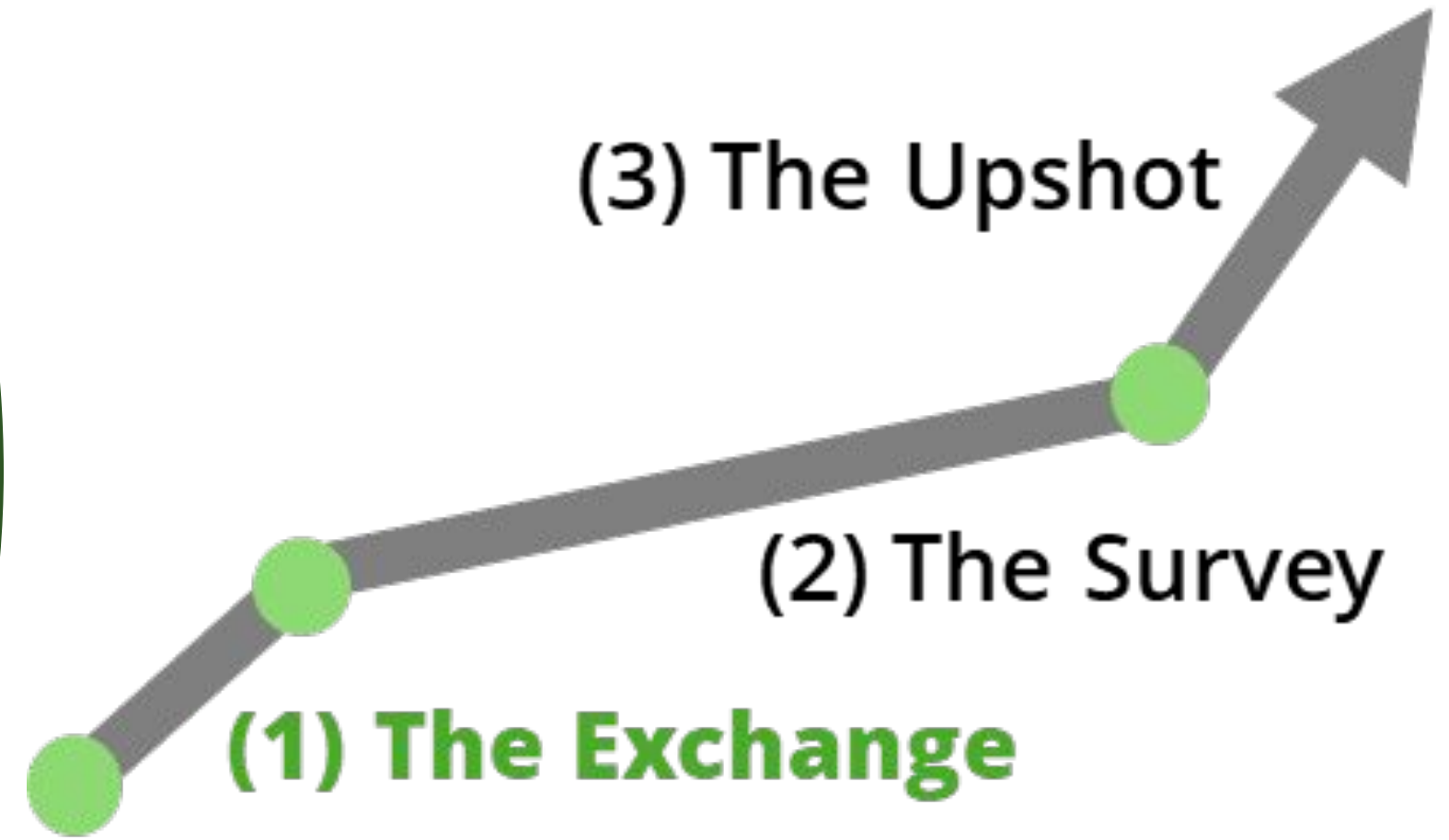
GREEN INFRASTRUCTURE LEADERSHIP EXCHANGE
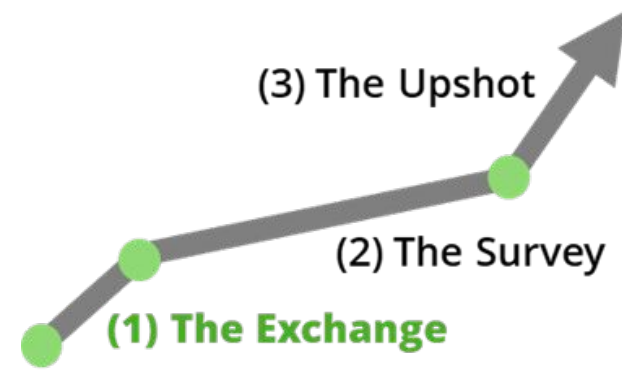
Barbara L. Hopkins, Esq., ASLA

Executive Director

Washtenaw County, MI

The Game Plan

(3) The Upshot

(2) The Survey

(1) The Exchange

(3) The Upshot

(2) The Survey

(1) The Exchange

The Exchange ...

... is a cross-sector, social impact network and community of practice that seeks to activate local governments in the U.S. & Canada to implement green stormwater infrastructure (GSI) equitably.

Philadelphia, PA

What is GSI?

GSI uses plants, soils, and other media to capture and treat stormwater at its source. It relies on the natural processes of filtration, infiltration, and evapotranspiration to manage stormwater.
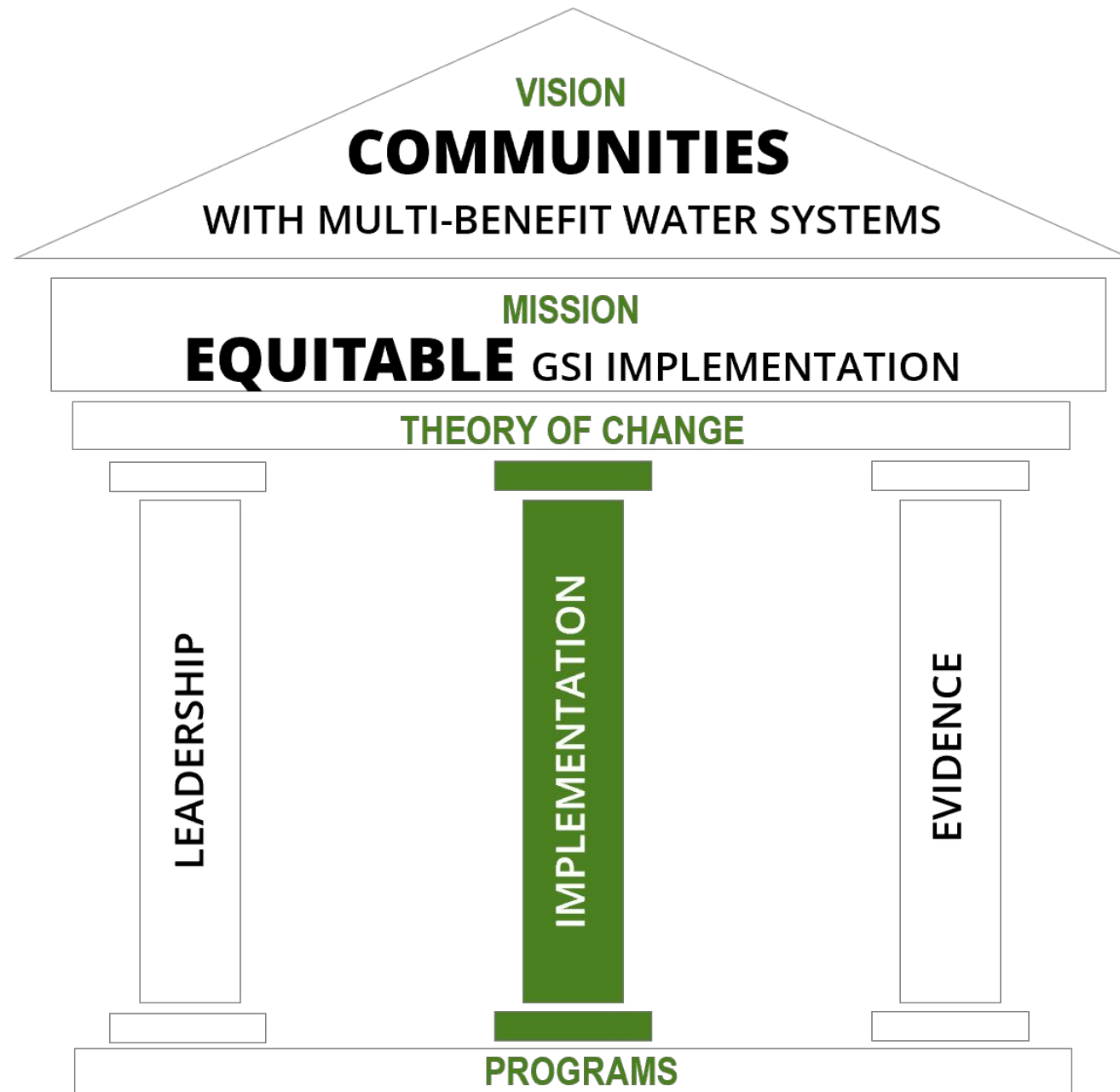

Bioretention

Planter Box

Permeable Pavers

Green Roof

VISION
COMMUNITIES
WITH MULTI-BENEFIT WATER SYSTEMS

MISSION
EQUITABLE GSI IMPLEMENTATION

THEORY OF CHANGE

LEADERSHIP

IMPLEMENTATION

EVIDENCE

PROGRAMS

Framing:
- Framework of GSI Practice
- Peer Learning
- Educ. Res. & Needs Survey
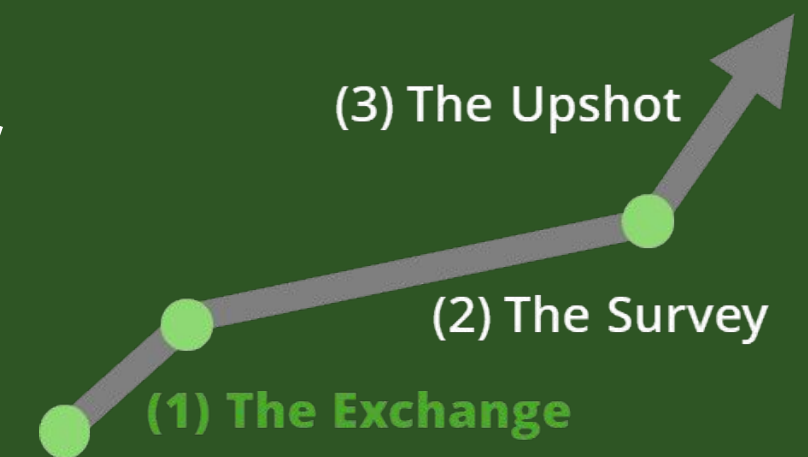- Re-grant Program
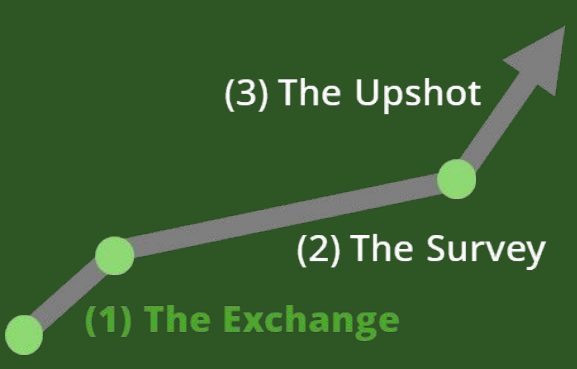- Partnership Projects

Training:
- Training Courses
- Webinars
- Annual Meeting
- Catalyst Program

Making the Evidentiary Case
- GI Library
- The State of Public Sector GSI
- GSI Impact Hub

Theory of Change

(3) The Upshot

(2) The Survey

(1) The Exchange

(3) The Upshot

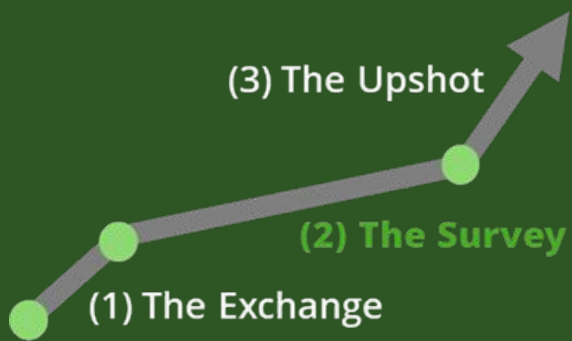(2) The Survey

(1) The Exchange

In 2021, there was plenty of evidence that demand for nature-based solutions was rising.

"The survey data shows that communities are greatly concerned about a range of climate risks and impacts. They are looking to … solutions that both store carbon and increase resilience to extreme heat, flooding, drought, sea level rise, and other climate impacts."

~ American Society of Landscape Architects, First National Survey on Client Demand for Landscape Architecture Solutions to Climate Change

But we knew little about implementation, especially in the public sector .

(3) The Upshot

(2) The Survey

(1) The Exchange

The State of Public Sector
Green Stormwater Infrastructure

2022

the green infrastructure
leadership exchange

https://www.stateofgsi.org/
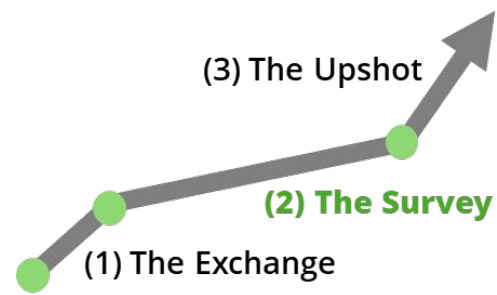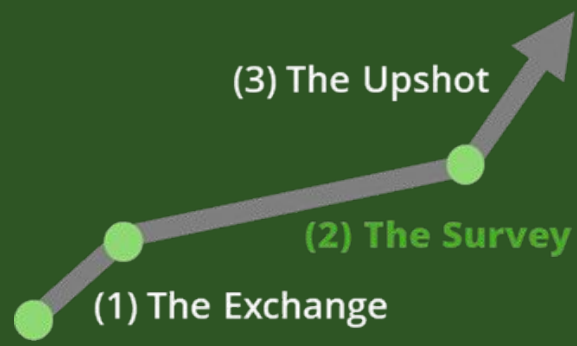
Survey Purpose

1

Understand the current **state of green infrastructure implementation**, and to assess the drivers, barriers, and levers affecting adoption.

2

Move the industry toward a **shared standard** for green infrastructure that's inclusive of equity, community engagement, co-benefits, and long term maintenance and fits within the One Water framework.

3

Offer **recommendations** for the public sector, and those that seek to support scaling of green stormwater infrastructure that serves communities.
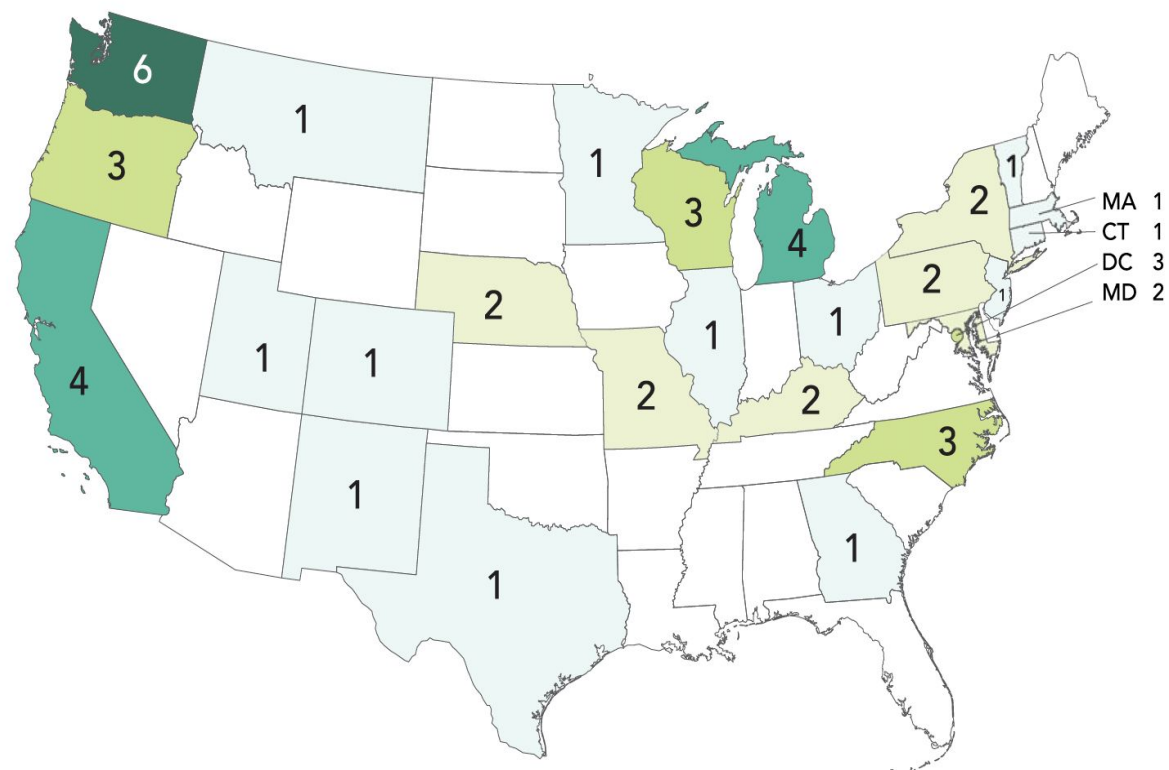
(3) The Upshot

(2) The Survey

(1) The Exchange

Whose story are we telling?

Omaha, NE
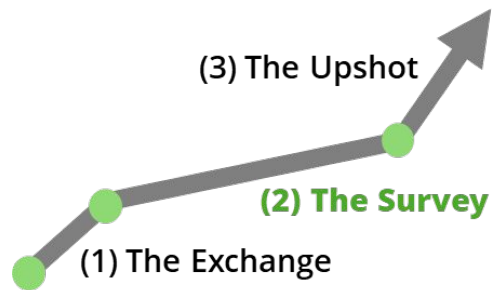
52 SMOs Responded
They represent 13% of the U.S. population

Population size of Jurisdiction Served

Map numbers: 6, 1, 1, 1, 3, 3, 4, 2, 1, 2, MA 1, CT 1, DC 3, MD 2, 4, 1, 2, 1, 1, 2, 2, 3, 1, 1

Donut chart:
- 29%
- 25%
- 33%
- 13%

- Very Large (Over one million)
- Large (500,000-999,999)
- Medium (100,000-499,000)
- Small (20,000-99,000)

Stormwater fee
- 56%
- 34%
- 10%
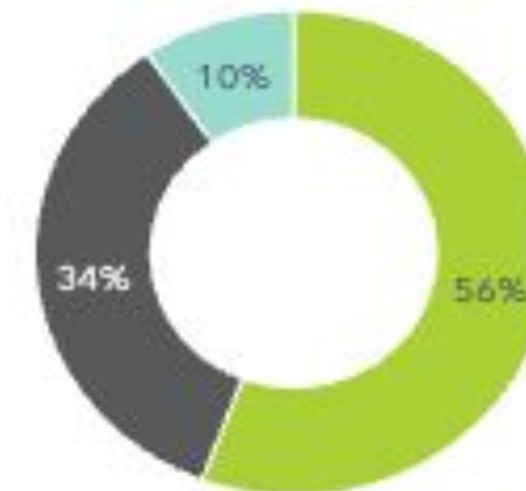
- Yes
- No
- In progress

Size of GSI Team

Median # FTEs Focused on GSI:
Planning + Delivery Staff 3
Maintenance Staff 2

TOTAL YEARS OF GSI PLANNING & DEVELOPMENT

- <5 years
- 6-10 years
- 11-15 years
- 16-20 years
- >20 years

6% | 33% | 38% | 12% | 12%
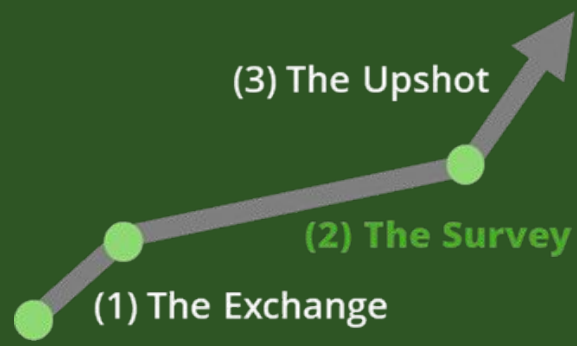
Sewer Type of Jurisdition
- 2%
- 2%
- 48%
- 48%
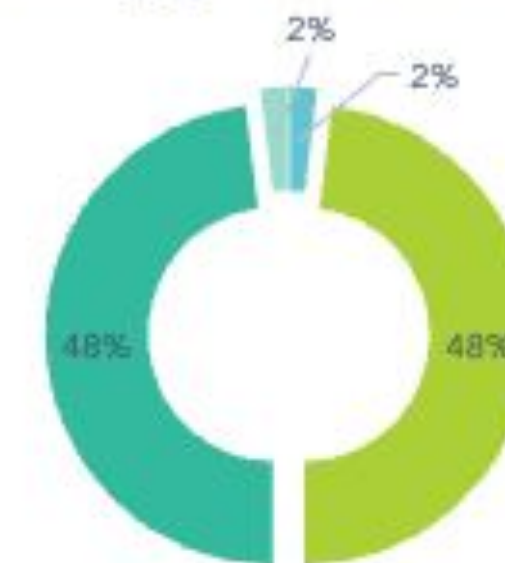
- Combined
- Combined & Separated
- Separated
- Other

10

(3) The Upshot

(2) The Survey

(1) The Exchange

What are we spending?

Portland, OR
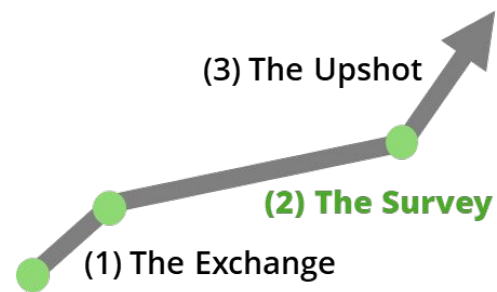
10% of Stormwater-Related Costs
Are for GSI

	Range	Median
Current Annual Total Capital Expenditures for Stormwater Management (USD)	$0 - $288,870,000	$2,750,000
Current Annual Green Infrastructure-Related Capital Expenditures (USD)*	$0 - $156,030,000	$280,000
Current Annual Green Infrastructure-related O&M Expenditures (USD)*	$0 - $5,300,000	$100,000
Percent of Stormwater Annual Capital Expenditures Spent on Green Infrastructure**		10%
$/Drainage Acre Managed	$0 - $930,000	$38,168
$/Gallon	$0 - $46	$1.07

(3) The Upshot

(2) The Survey

(1) The Exchange

Where are we spending it?

Kansas City, MO
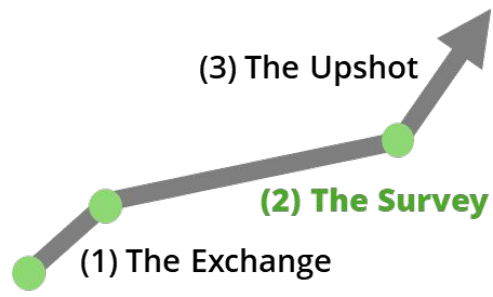
Mostly on Public Land
58% of acres managed are public

Total acres per land type

	4,396	5,671	13,244	3,526	13,171
	Publicly developed right-of-way retrofits	Privately developed right-of-way retrofits	Public parcel retrofits	Private property retrofits	Private new development / redevelopment
	RIGHT-OF-WAY RETROFITS		PARCEL RETROFITS		DEVELOPMENT

(3) The Upshot

(2) The Survey

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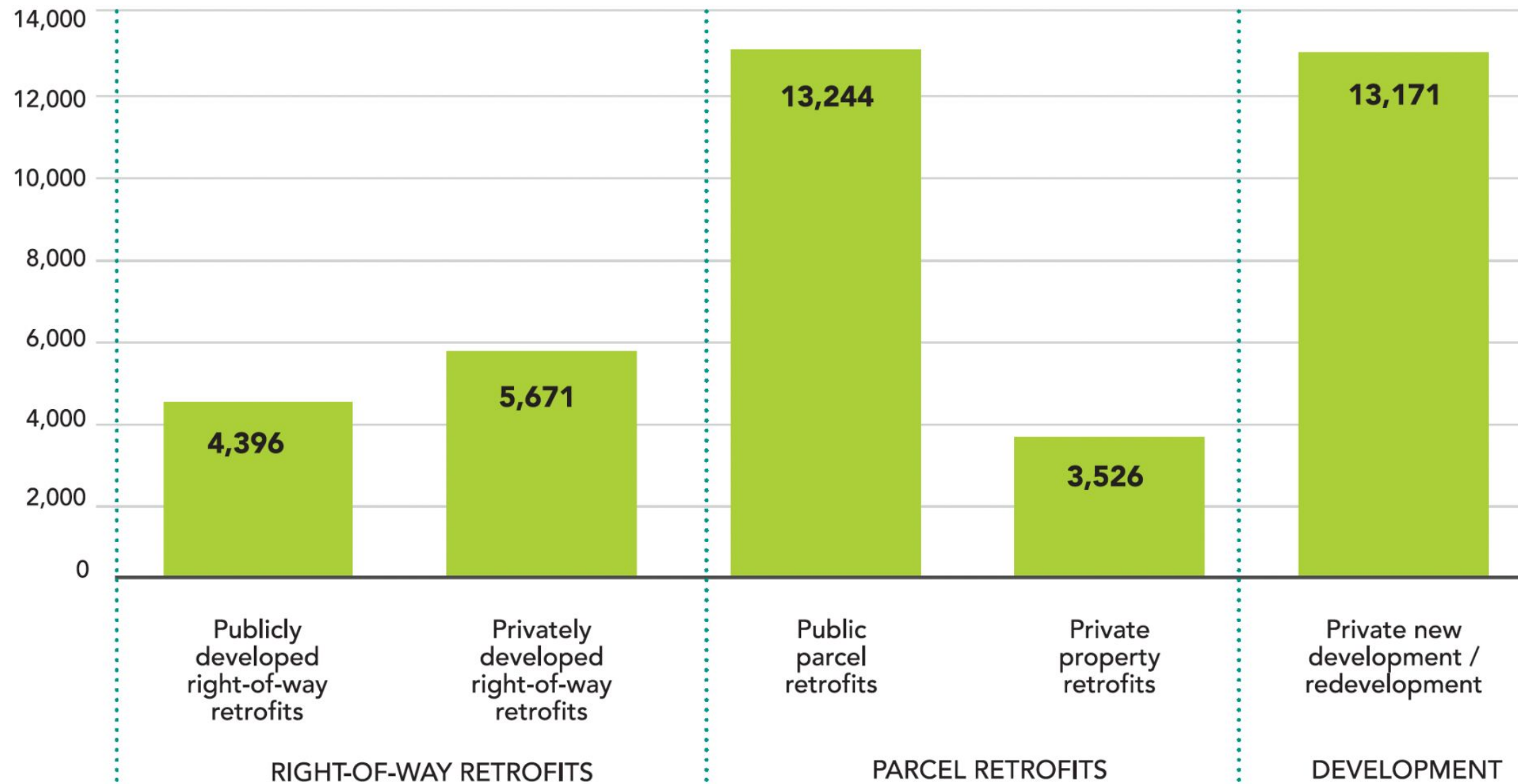
The State of Drivers

Toledo, OH
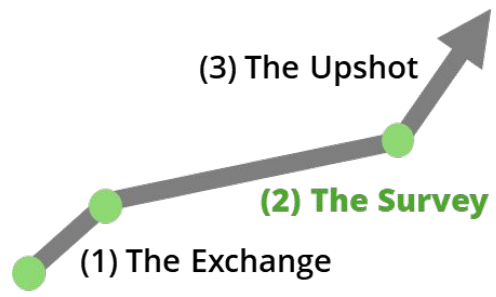
Regulation is the #1 driver
Flood resilience, aging infrastructure & quality of life rank highly

GSI Support Drivers

(3) The Upshot

(2) The Survey

(1) The Exchange
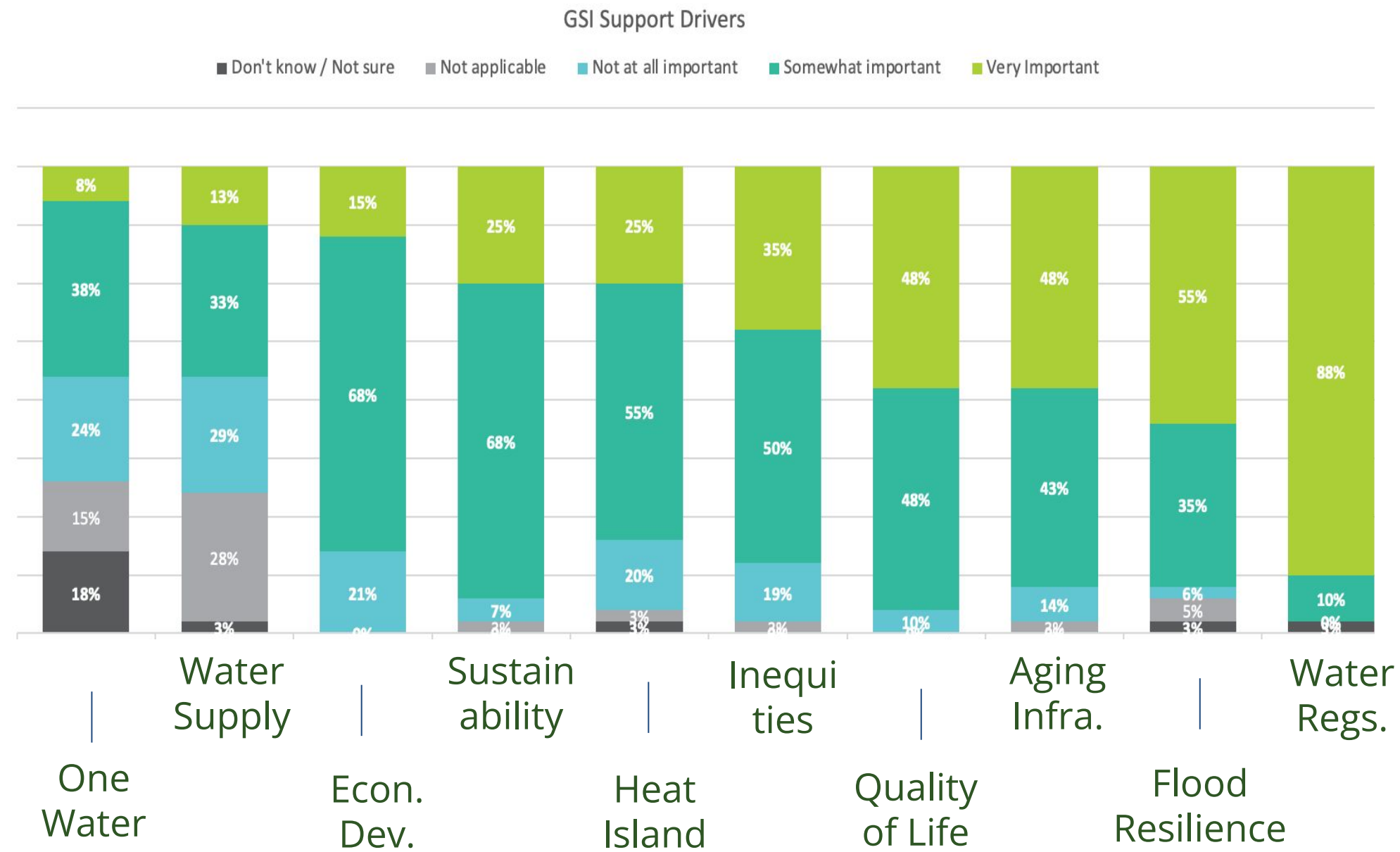
Advancing a National Standard

Seattle, WA

Envisioning a New GSI Standard

Centers Community → Vegetative Practices → Multiple Benefits → Impact Assessed → Maintained → Regularly Inspected → Targets Disadvantaged Communities

(1) The Exchange
(2) The Survey
(3) The Upshot

A LOT of work to do to prioritize all factors as a new GSI standard

Most factors prioritized at least sometimes.

GSI PRIORITY FREQUENCY

■ Never ■ Sometimes ■ About half the time ■ Most of the time ■ Always

Factor	Never	Sometimes	About half the time	Most of the time	Always
Maintained	%	15%	10%	41%	33%
Regularly Inspected	%	15%	26%	26%	33%
Multiple Benefits	3%	21%	5%	54%	18%
Vegetative Practices	3%	18%	15%	44%	21%
Centers Communities	%	39%	13%	32%	16%
Impact Assessed	13%	58%	5%	21%	3%

19
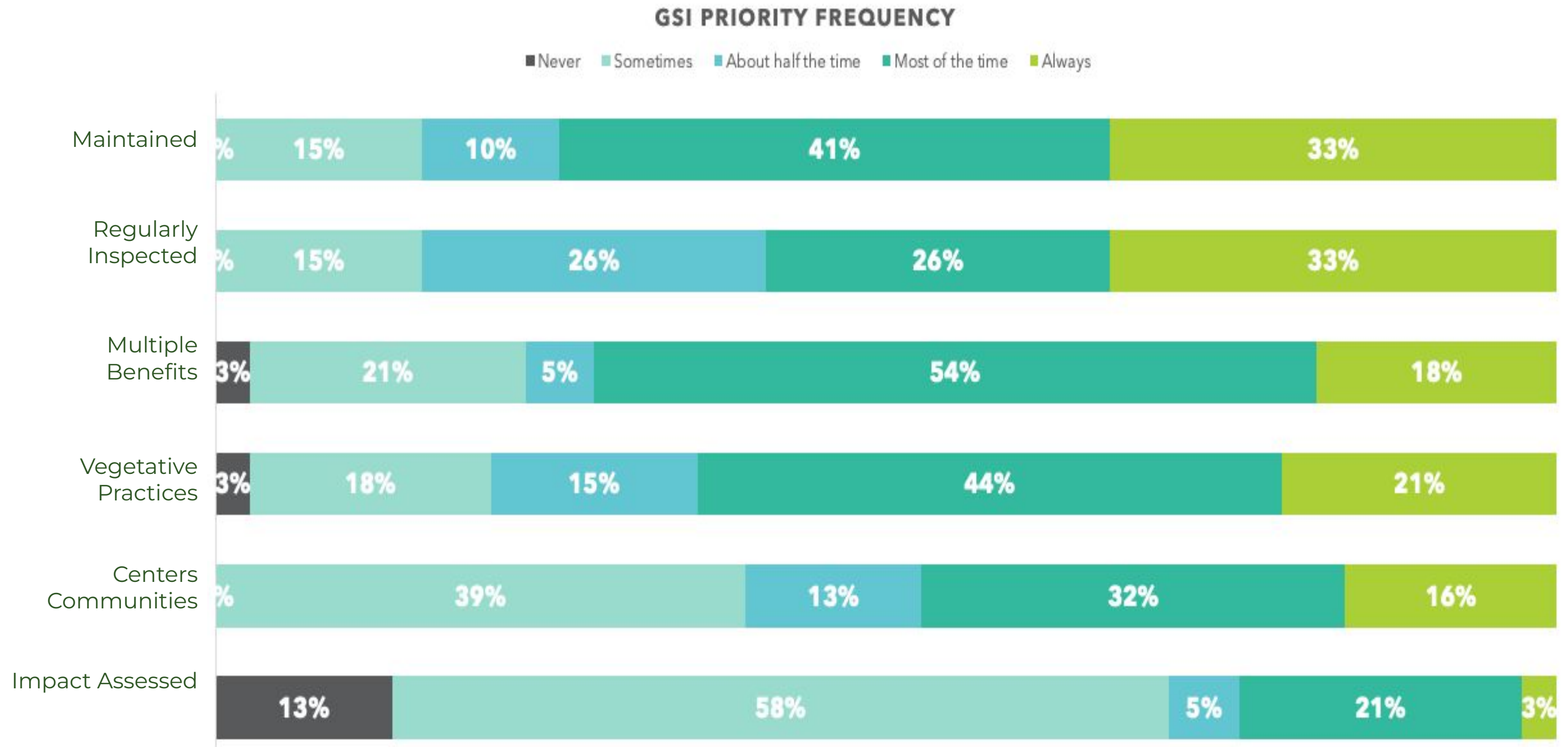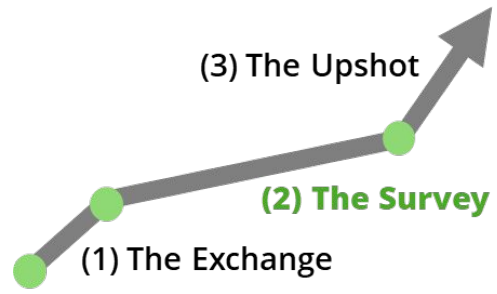
45% did not how much GSI funding targets vulnerable communities

What Percent of Your GSI Funding is Directed to High Equity Value Communities?

Less than 10%

10-24%

Don't know / Not sure

50-74%

25-49%

75-100%

(3) The Upshot

(2) The Survey

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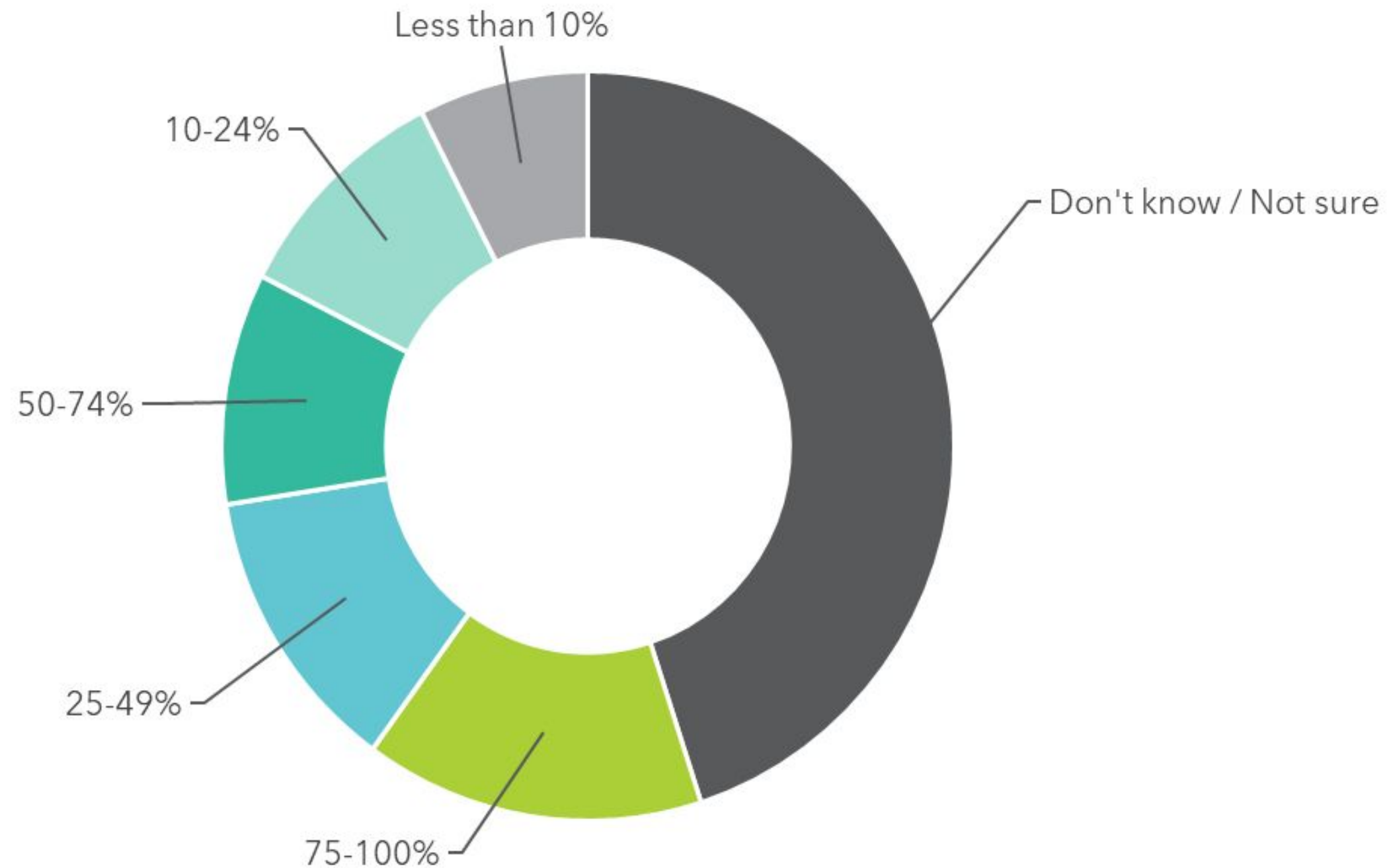
The State of Levers

Tucson, AR

EFFECTIVENESS OF USED LEVERS TO SCALE GSI

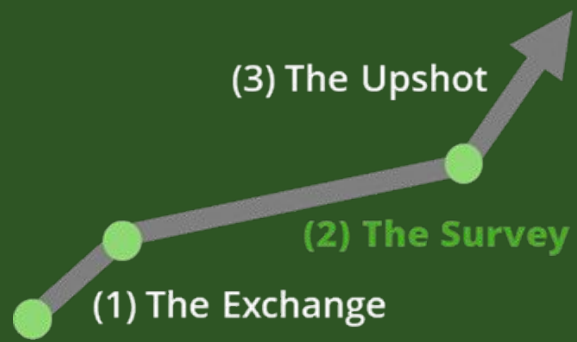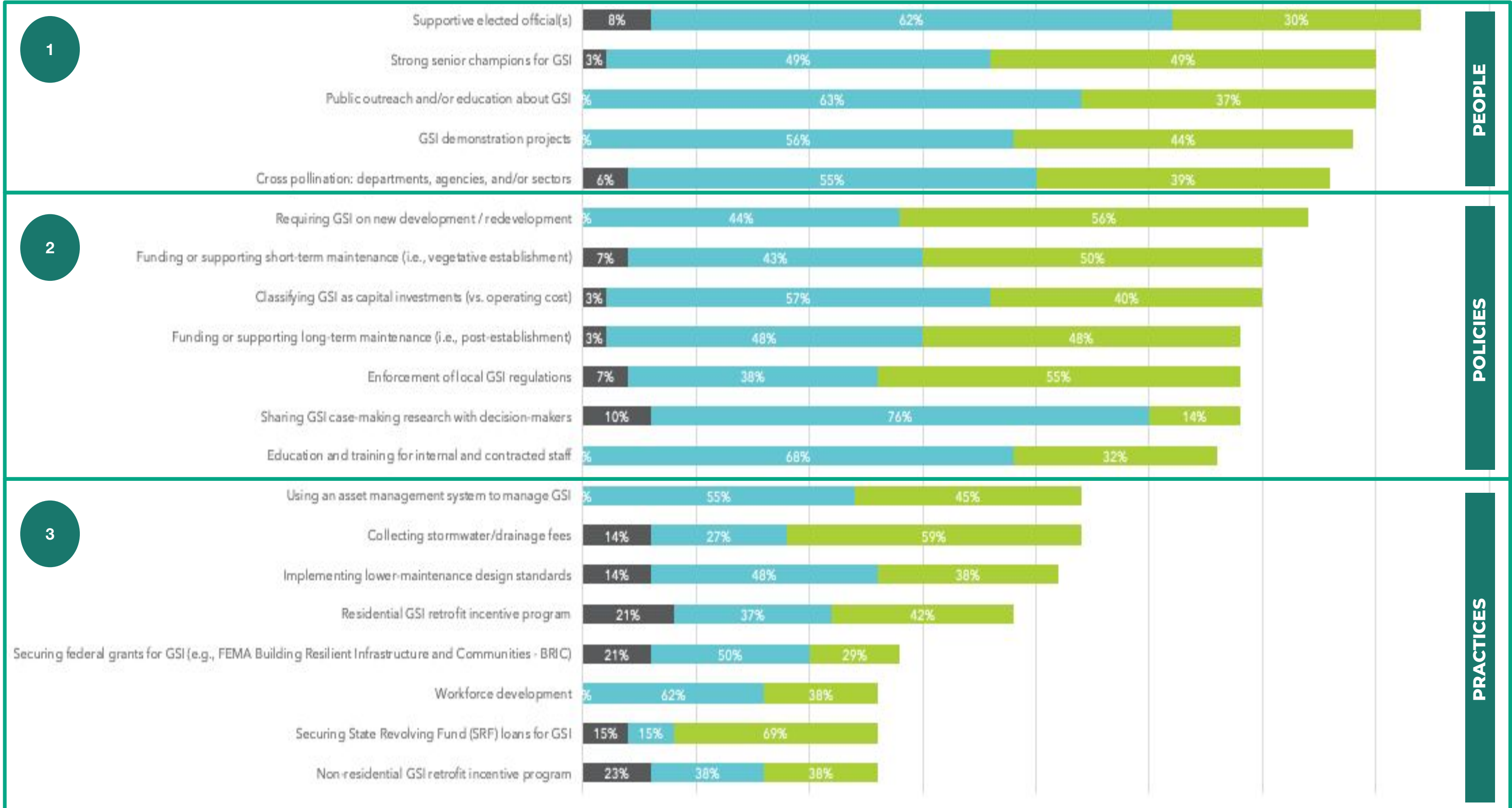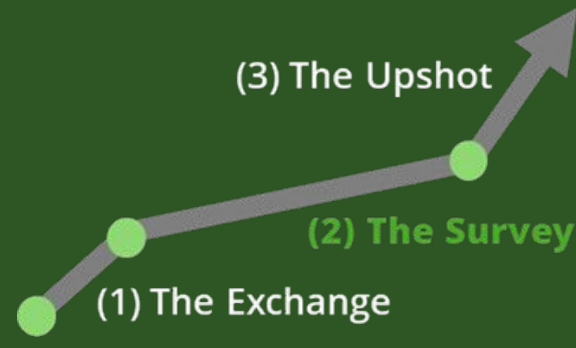■ Ineffective ■ Somewhat effective ■ Very effective

Count of Responses

PEOPLE (1)

Lever	Ineffective	Somewhat effective	Very effective
Supportive elected official(s)	8%	62%	30%
Strong senior champions for GSI	3%	49%	49%
Public outreach and/or education about GSI		63%	37%
GSI demonstration projects		56%	44%
Cross pollination: departments, agencies, and/or sectors	6%	55%	39%

POLICIES (2)

Lever	Ineffective	Somewhat effective	Very effective
Requiring GSI on new development / redevelopment		44%	56%
Funding or supporting short-term maintenance (i.e., vegetative establishment)	7%	43%	50%
Classifying GSI as capital investments (vs. operating cost)	3%	57%	40%
Funding or supporting long-term maintenance (i.e., post-establishment)	3%	48%	48%
Enforcement of local GSI regulations	7%	38%	55%
Sharing GSI case-making research with decision-makers	10%	76%	14%
Education and training for internal and contracted staff		68%	32%

PRACTICES (3)

Lever	Ineffective	Somewhat effective	Very effective
Using an asset management system to manage GSI		55%	45%
Collecting stormwater/drainage fees	14%	27%	59%
Implementing lower-maintenance design standards	14%	48%	38%
Residential GSI retrofit incentive program	21%	37%	42%
Securing federal grants for GSI (e.g., FEMA Building Resilient Infrastructure and Communities - BRIC)	21%	50%	29%
Workforce development		62%	38%
Securing State Revolving Fund (SRF) loans for GSI	15%	15%	69%
Non-residential GSI retrofit incentive program	23%	38%	38%

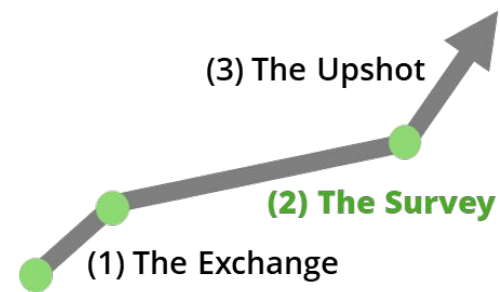(3) The Upshot

(2) The Survey

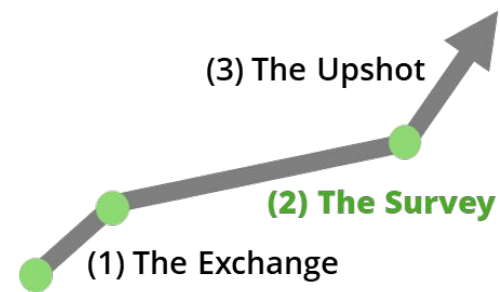(1) The Exchange

Recommendations

Milwaukee, WI

Early Stage: Build Buy-in

Begin by pulling the levers required for any successful government program: buy-in from, and engagement with the people who control resources and priorities:

- Cultivate supportive elected official(s)
- Hire, promote, cultivate, and retain strong senior champions f
- Invest in public outreach and/or education about GSI
- Develop multi-benefit demonstration projects
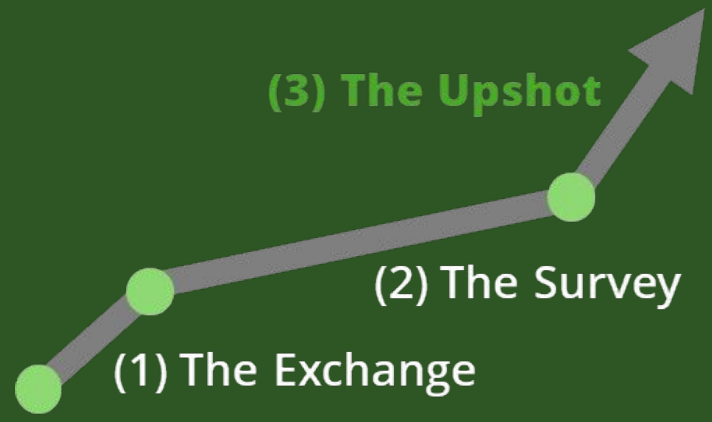- Reduce silos and advance coordination between departments.

Mid-Stage: Align policies & funding

- Classify green infrastructure as a capital investment.
- Regulate: Requiring GSI on new & re-development .
- Fund and support short- and long-term maintenance.
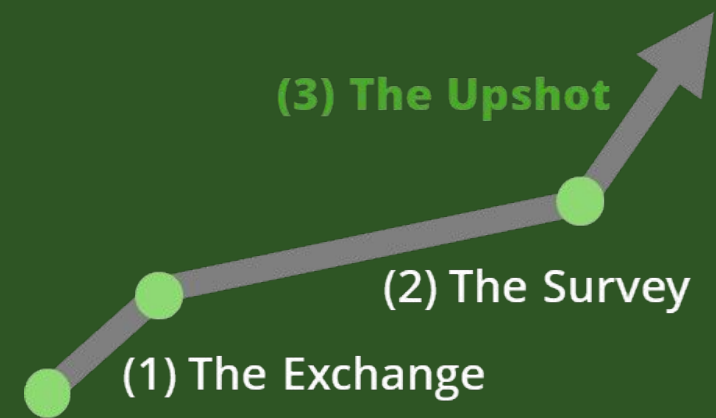- Invest in training for staff.
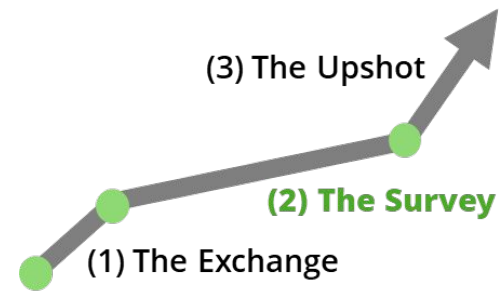
Advanced: Adopt Emerging Best-Practices

- Diversify funding streams.
- Implement local design standards .
- Adopt an asset management system.
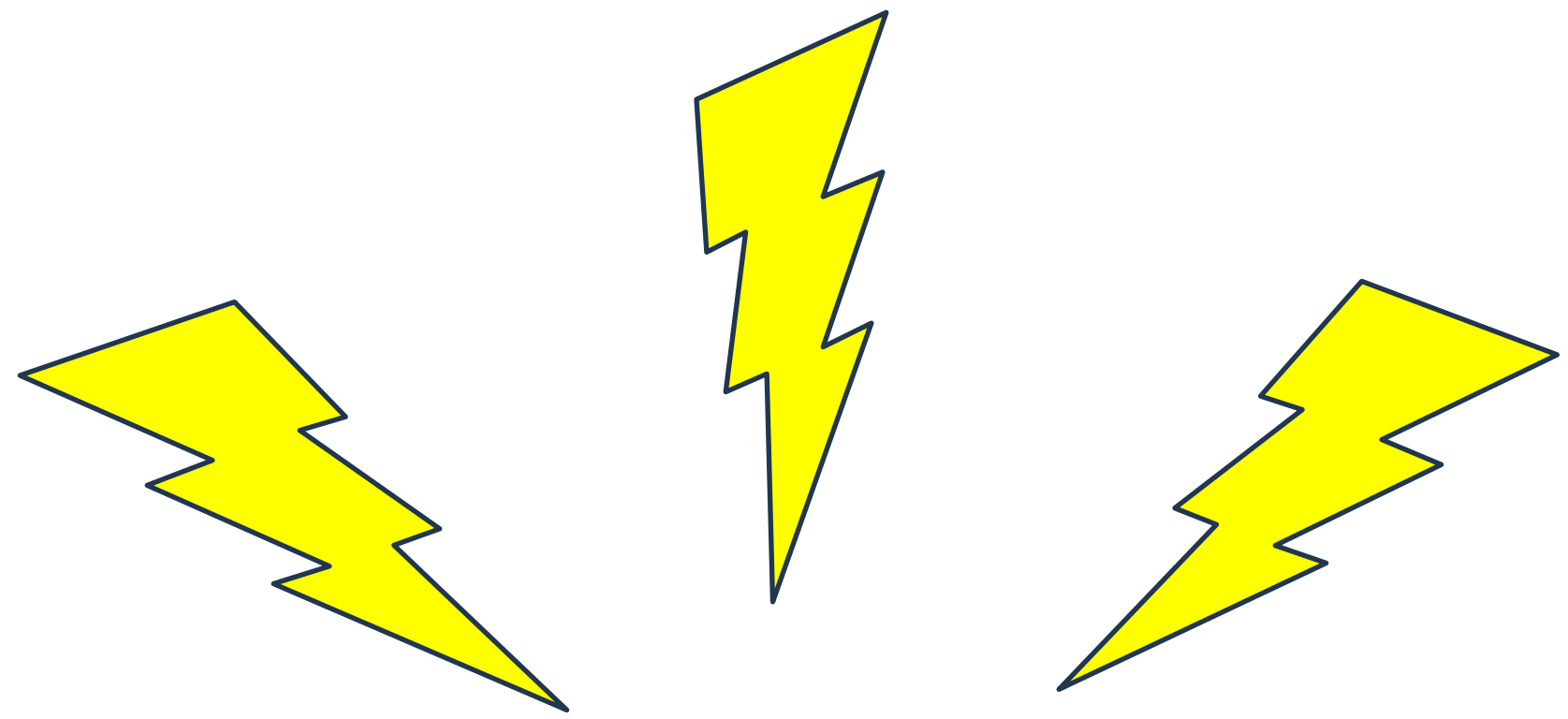- Implement workforce development strategies.

(3) The Upshot

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(1) The Exchange

The Upshot

Pittsburgh, PA

(3) The Upshot

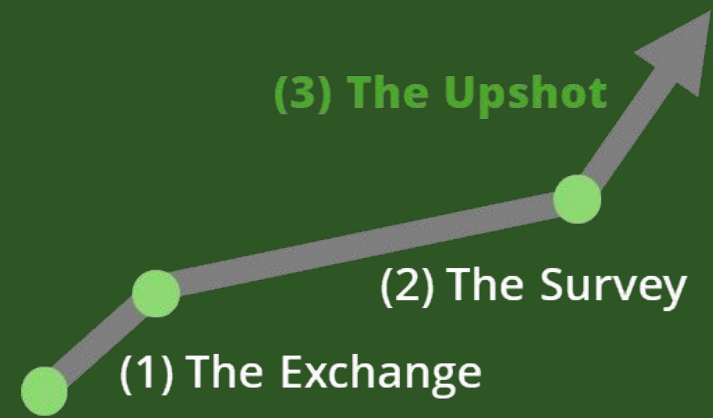(2) The Survey

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- **Our own members say (1) standards are not prioritized; (2) we don't know if resources are targeting disadvantaged communities;**

THE PERFECT STORM
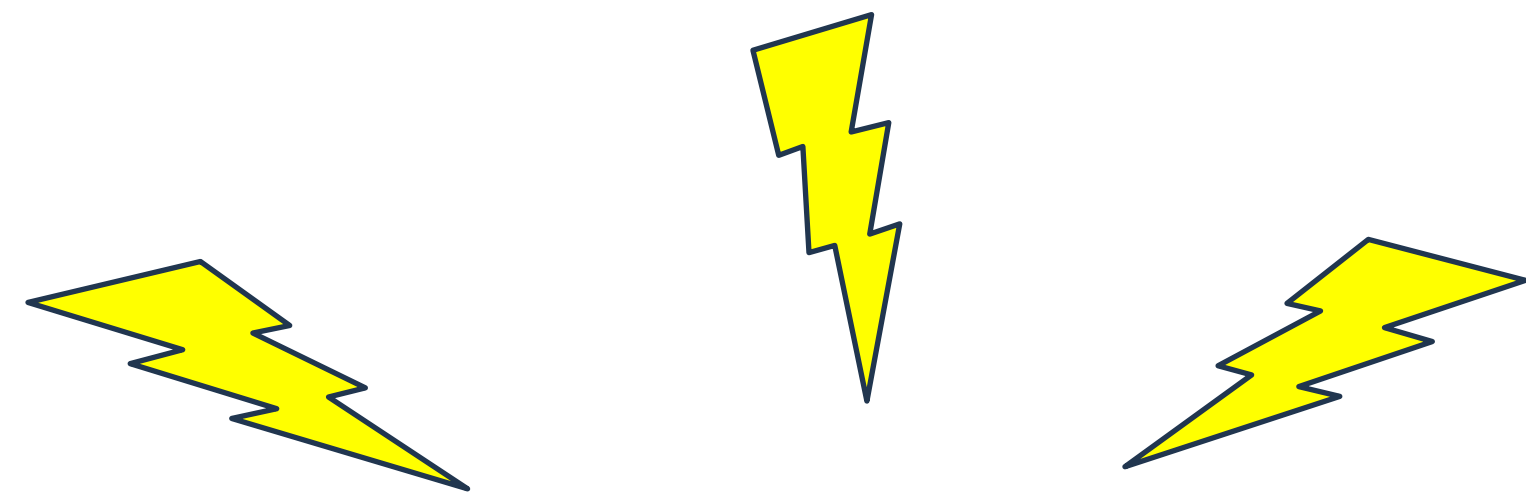
(3) The Upshot

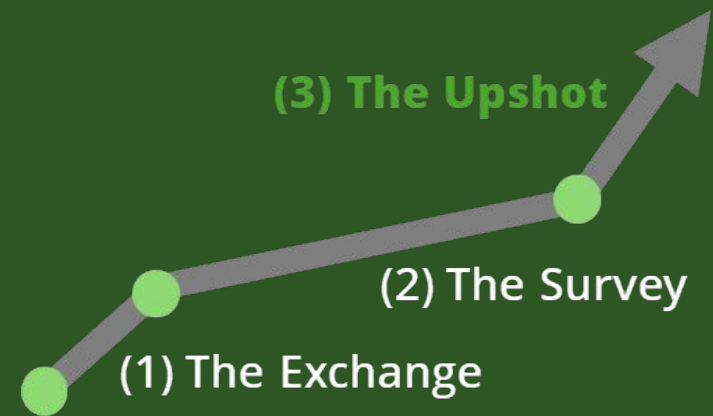(2) The Survey

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THE PERFECT STORM

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- **A WEF survey reveals the lack of information on GI to be prolific.**

A 2022 survey of 643 MS4 permittees across 47 states revealed green infrastructure as one of the greatest areas of need for informational/ technical resources – *for the 3rd year in a row*.
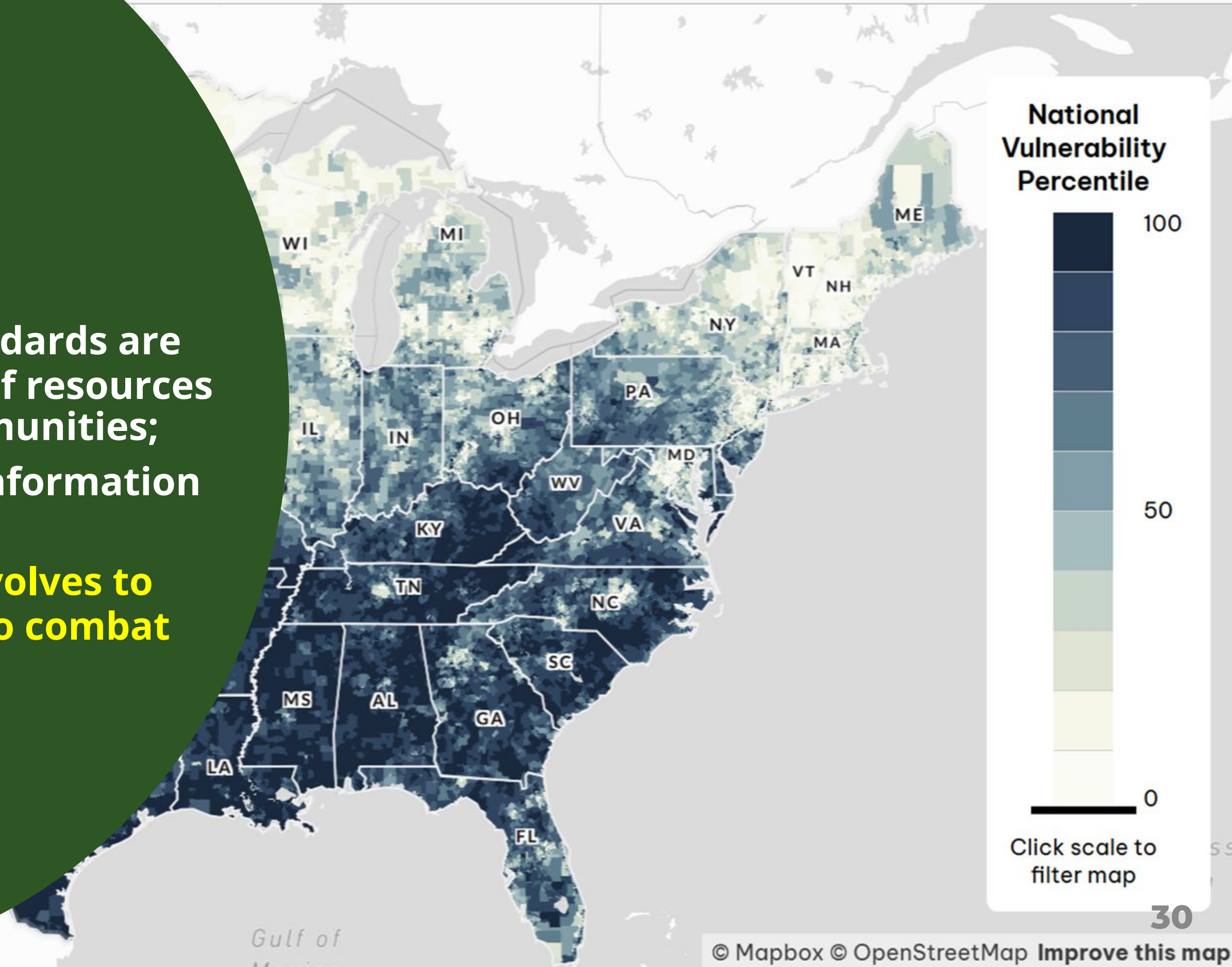
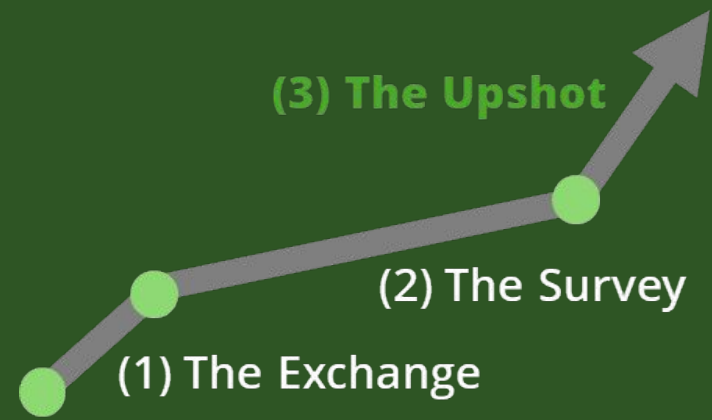~ Water Environment Federation, 2022 MS4 Needs Assessment Survey

Counties **Tracts**

effects on neighborhood-level stability.

(3) The Upshot

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National Vulnerability Percentile

100

50
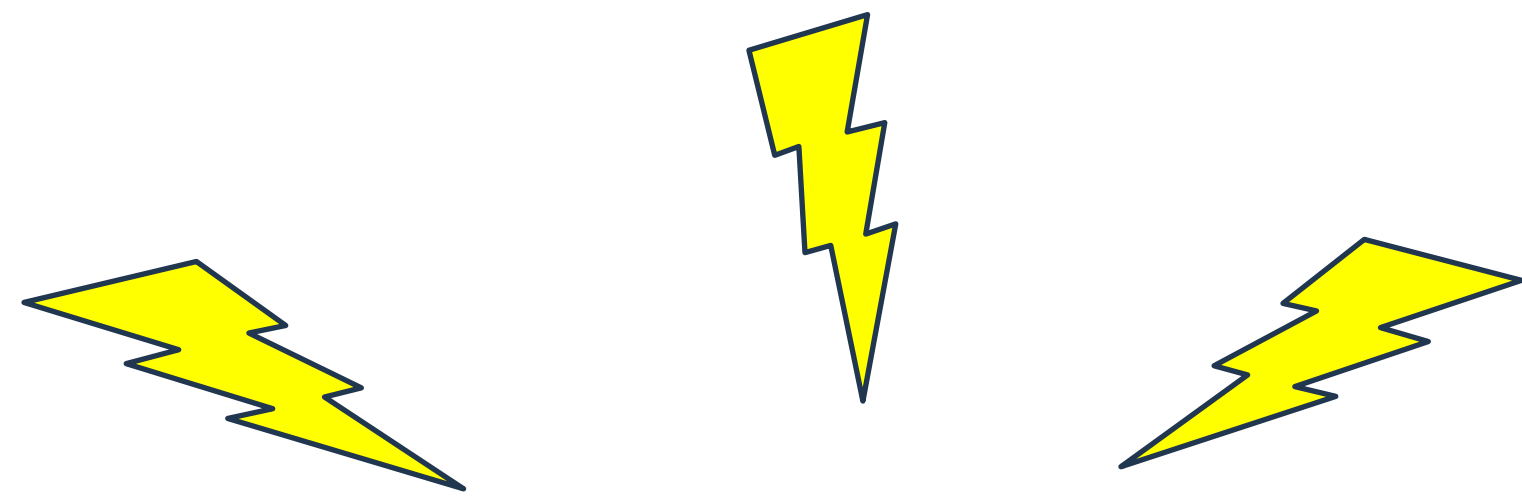
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Click scale to filter map

THE PERFECT STORM

- **Our own members say** (1) GSI standards are not prioritized; (2) we don't know if resources are targeting disadvantaged communities;

- **A WEF survey** reveals the lack of information on GI to be prolific.

- **The Climate Vulnerability Index** evolves to show the urgency for scaling GSI to combat climate change.

© Mapbox © OpenStreetMap **Improve this map**

(3) The Upshot

(2) The Survey

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THE PERFECT STORM

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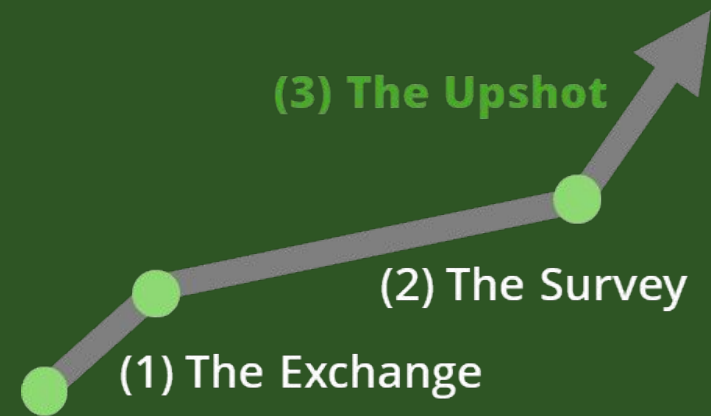- **A GSI expert says collaboration across sectors is needed to combat climate change equitably.**

"Addressing climate change equitably requires the integration of strategy and action across academia, industry, and government … Each sector has something to give and something to receive. We can fill in each other's gaps. No one entity can do it all."

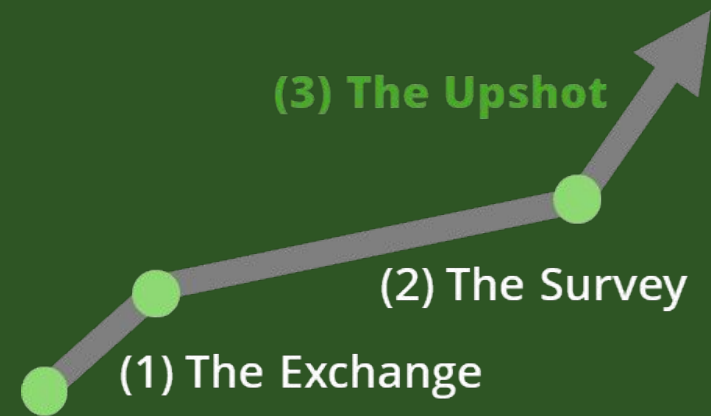~ *Jalonne White-Newsome, White House Council on Environmental Quality.*

(3) The Upshot

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- **A GSI expert says collaboration across sectors is needed to combat climate change equitably.**

- **A new book says that scale demands the development of an organizing framework.**
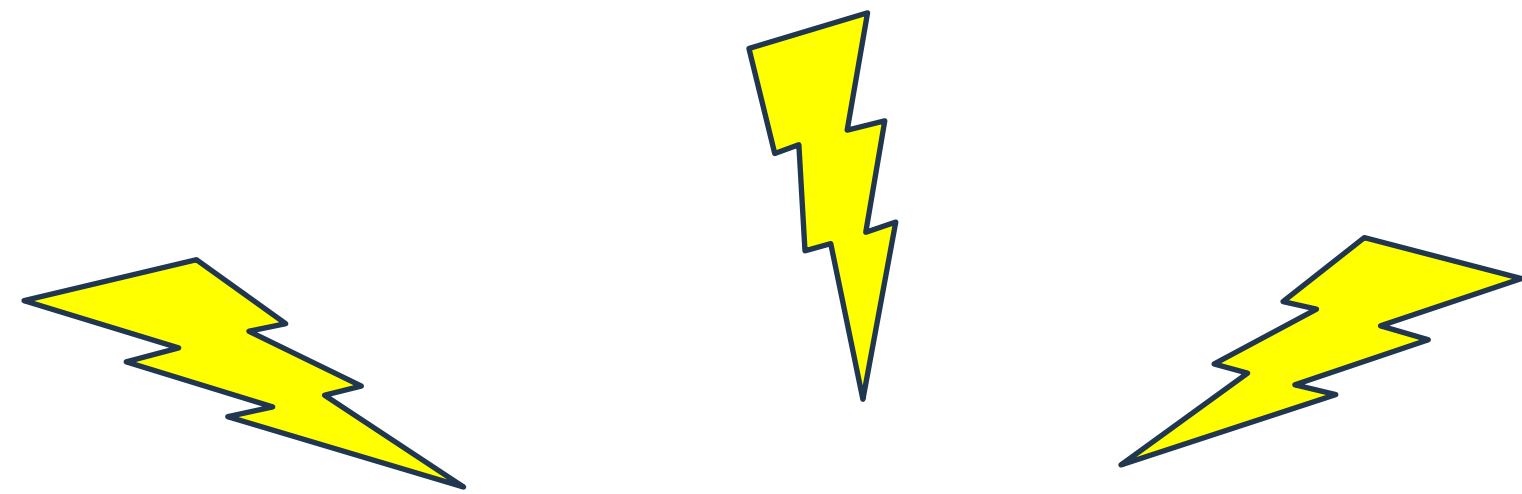
- "Innovators should precisely define the field they have targeted for change or emergence, starting with its basic conceptual frameworks and existing practices."

- "With such a framework in place, innovators are then able to develop roadmaps for how they will influence the field over the long term."

~ P. Plastrik, et. al. *Connect, Innovate, Scale-Up: How Networks Create Systems Change.*, p. 140 (2022).

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(3) The Upshot

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- **Philanthropy for water begins to wane.**
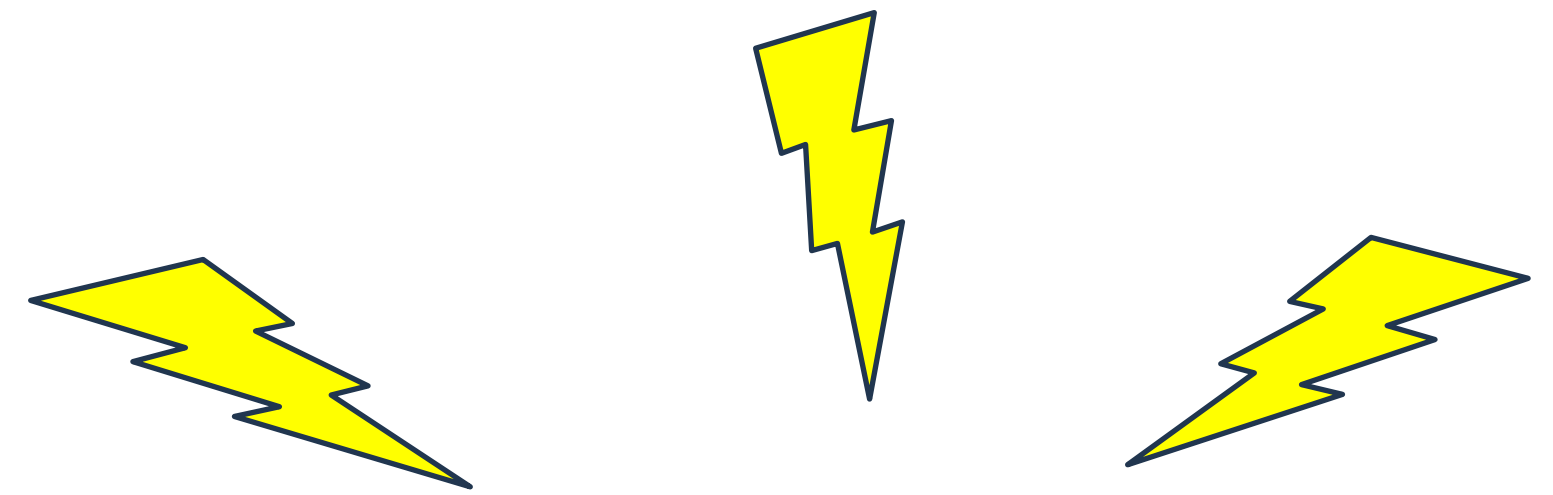
"America's water crisis is pervasive, widespread, and getting worse. Fueled by climate change, it manifests itself in small and large ways — from dried-up family wells to superstorm-driven floods … Philanthropy, however, is barely skimming the surface when it comes to addressing the problem …."

~ A. Helsel. "Urgent Water Action is Needed as the Nation's Water Crisis Claims Lives & Livelihoods." *Chronicle of Philanthropy*, October, 2022**.**
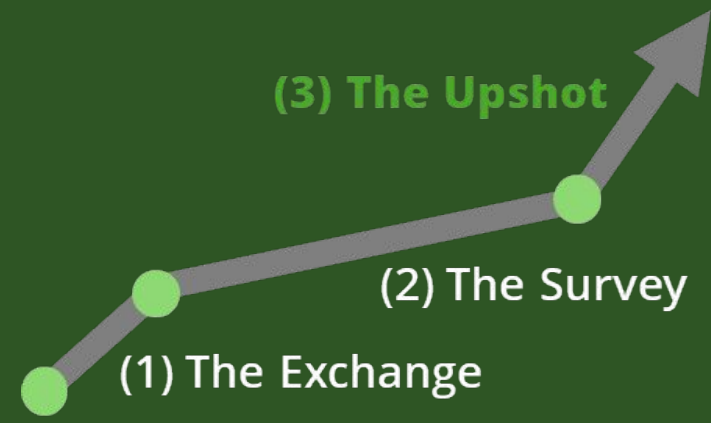
What Can You Do?

(3) The Upshot

(2) The Survey

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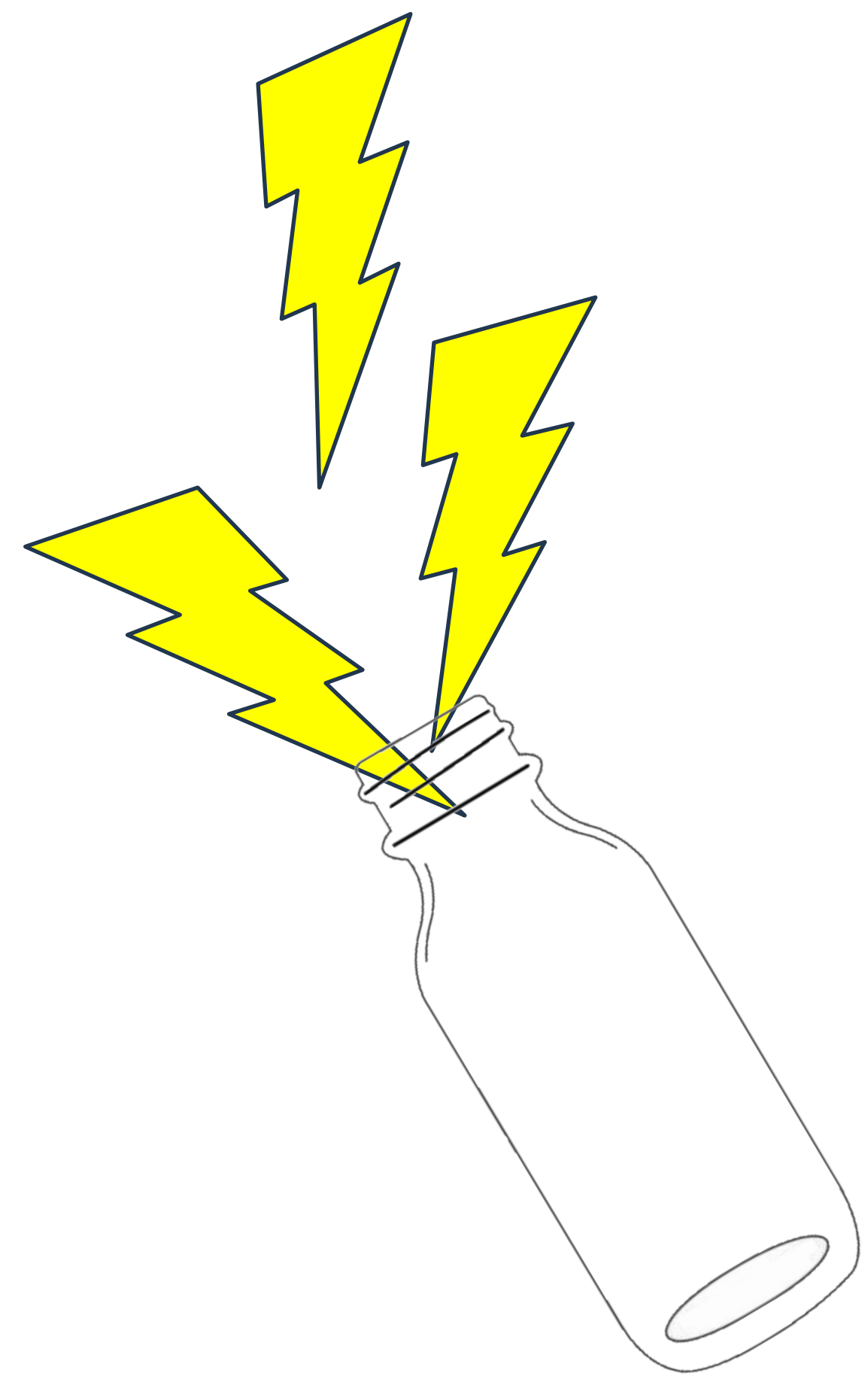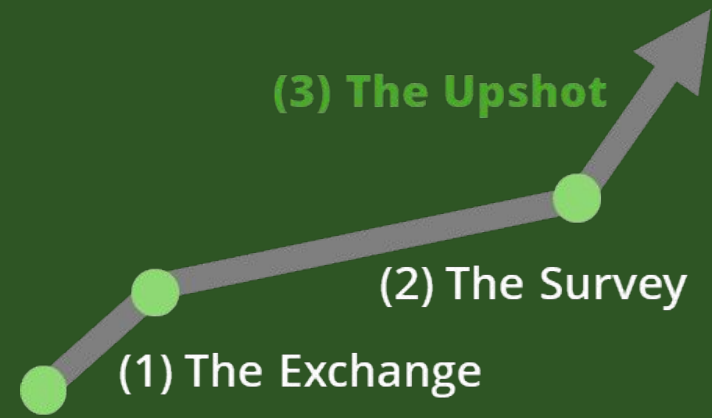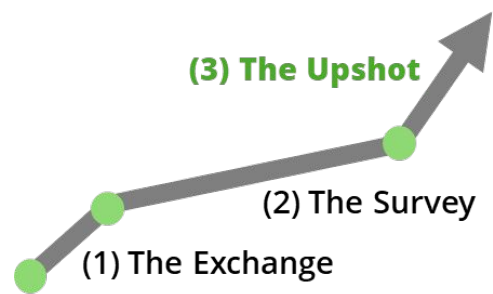
"He who rejects change is the architect of decay. The only human institution which rejects progress is the cemetery."

~ Harold Wilson

(3) The Upshot

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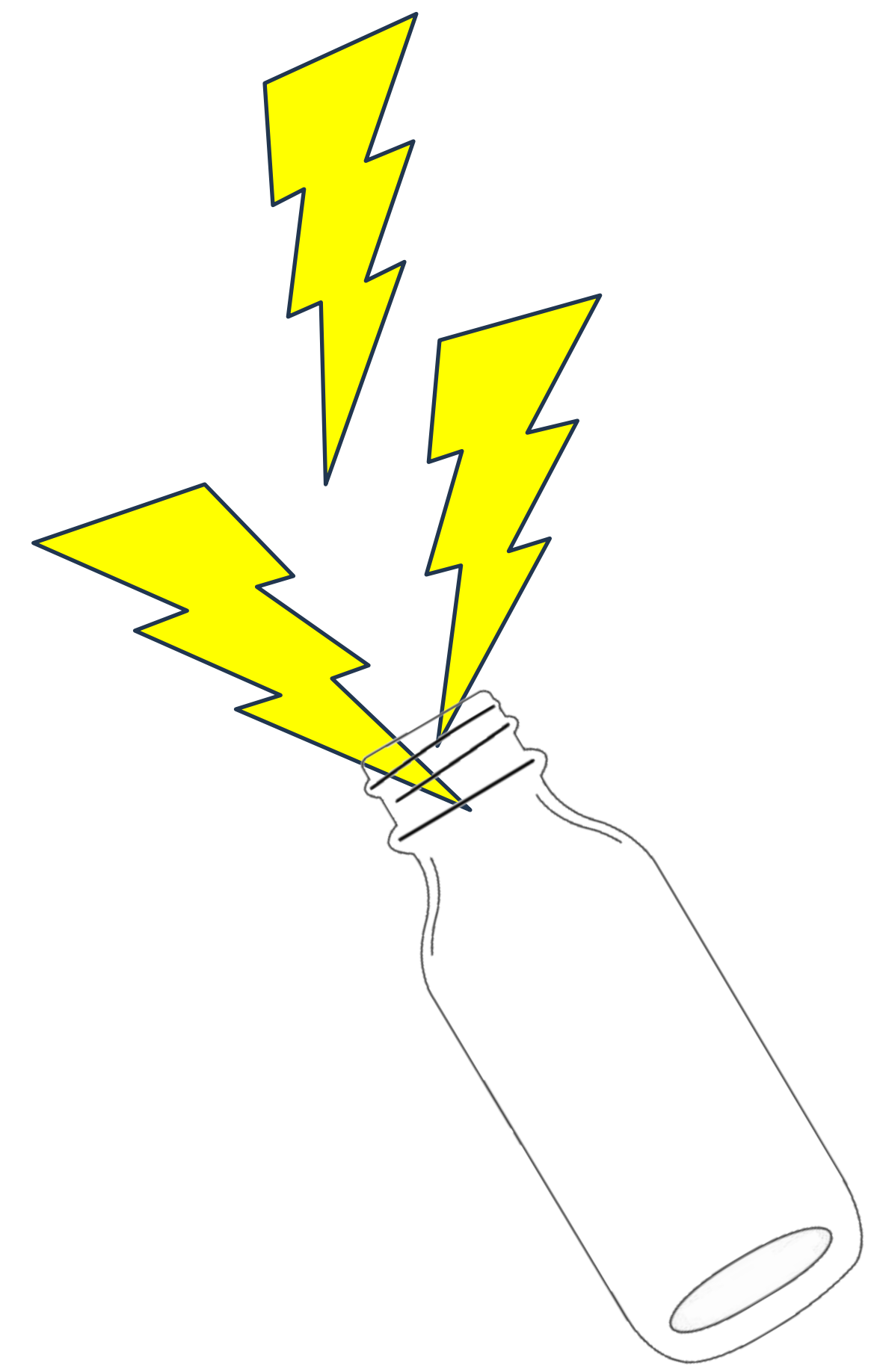
What Can You Do?

- **Involve More Sectors: Expand Membership**
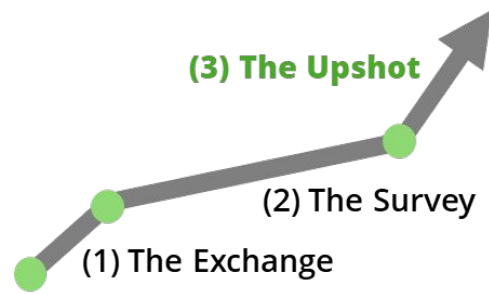
Expanded Membership

Previously limited to local governments and water agencies, we now proudly serve a diverse range of types, including:

- Local Governments and Stormwater Agencies

- Nonprofit Organizations

- Private Sector Entities (e.g., engineer firms)

- Educational, State, and Federal Government Organizations

- Solo practitioners, full-time faculty, and students.

SCAN TO LEARN MORE
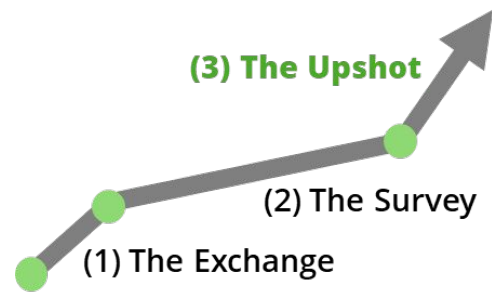
86 Organizations (587 Individuals)
From Across North America

Membership by Sector (Feb 2025)

Record Count
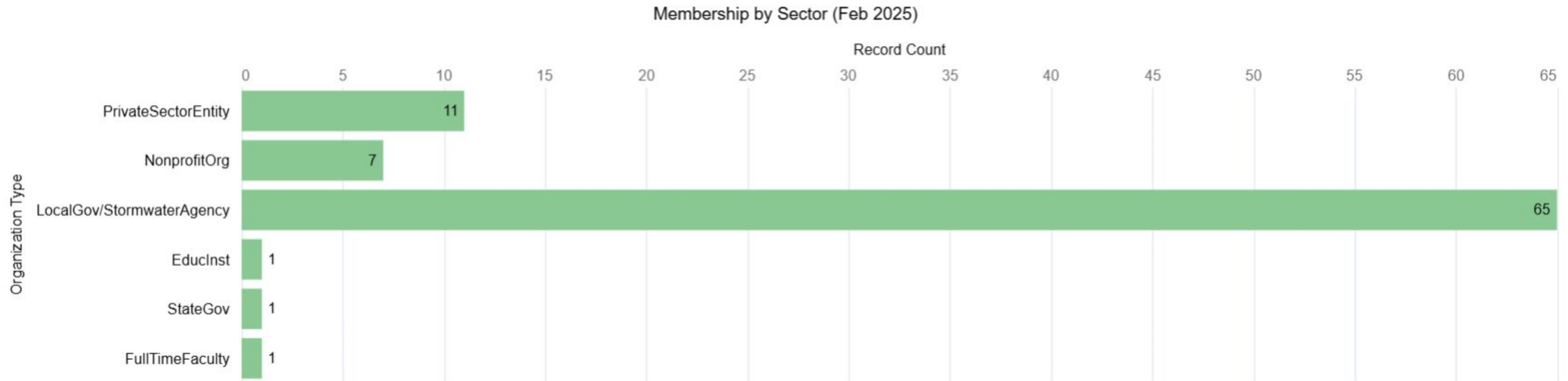
~ Exchange Salesforce Database, 2/20/2025

(3) The Upshot

(2) The Survey

(1) The Exchange

What Can You Do?

- **Involve more sectors: expand membership**
- **Develop an organizing framework for GSI**

The Framework of GSI Practice

Why? Establish a Shared Vision

1 (Completed)
Center Equity

This topic explores preparing teams for equitable GSI delivery; centering community; ensuring project selection, siting, and investments enhance equity; designing projects and programs for lasting community benefits; fostering economic stability and wealth building; mitigating displacement risks; identifying equitable policies and programs; addressing racial equity; combatting biases in urban planning; and promoting equitable distribution of assets and benefits.
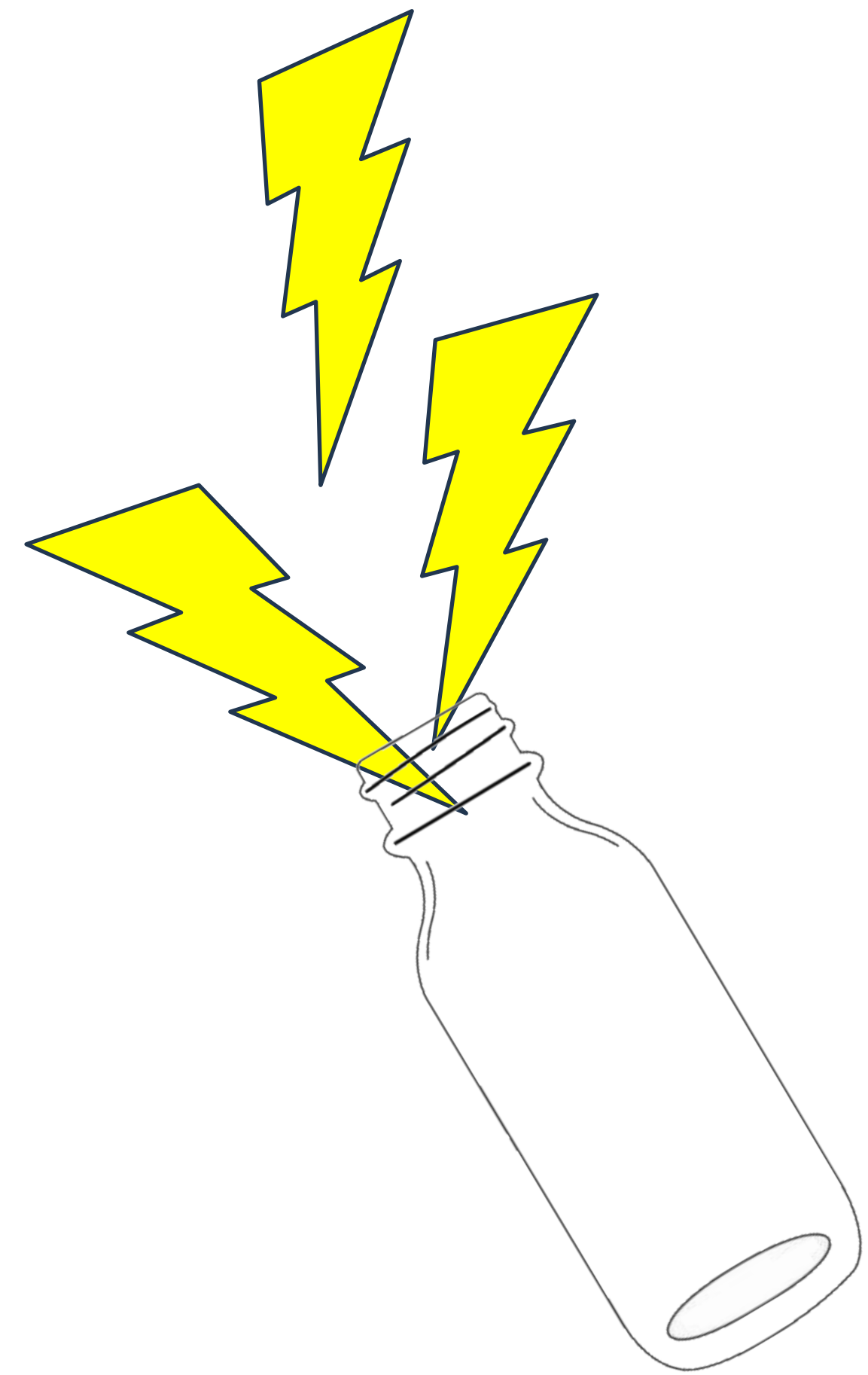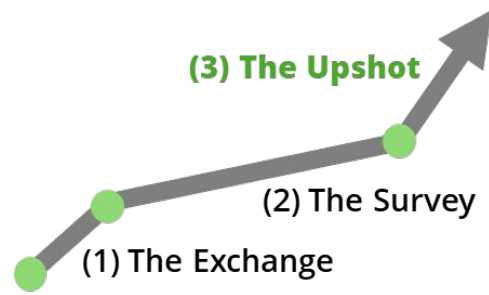
2
Advance Sustainability

This topic centers on advancing GSI as part of overarching sustainability goals, enhancing urban environments for cooler, safer and more biodiverse cities, and seamlessly integrating GSI strategies with other sustainability and resilience efforts. Key considerations include addressing climate resilience and implementing designs that are sustainable and adaptable to climate change.

3 (Completed)
Build Buy-in

This topic addresses making a compelling case for GSI: positioning green and gray solutions; securing leadership buy-in; fostering partnerships and intergovernmental coordination; employing effective narrative strategies; conducting cost-benefit analyses; engaging elected officials and senior champions; implementing public outreach; utilizing demonstration projects; sharing case-making research; fostering cross-pollination; and providing education and training.

What? Craft a Strategy

4
Align Policy, Procurement + Program

This topic focuses on understanding the regulatory environment at federal, state, and local levels; leveraging existing conditions to inform policies and programs; exploring program and procurement models; and coordinating across departments and agencies.

5
Fund

This topic covers determining how to pay for GSI; building public support for stormwater fees; identifying funding and financing tools aligned with program models; exploring funding accelerators; evaluating new financing approaches; obtaining loans and grants; securing funding for ongoing maintenance and asset management; and ensuring funding accessibility and equitable distribution.

6
Build Workforce + Capacity

This topic explores avenues for workforce training: ensuring confidence in knowledge and skills; assessing the potential need for mentor/protege, internship or apprenticeship programs; increasing opportunities in disadvantaged communities; forging partnerships; and program models for workforce development.
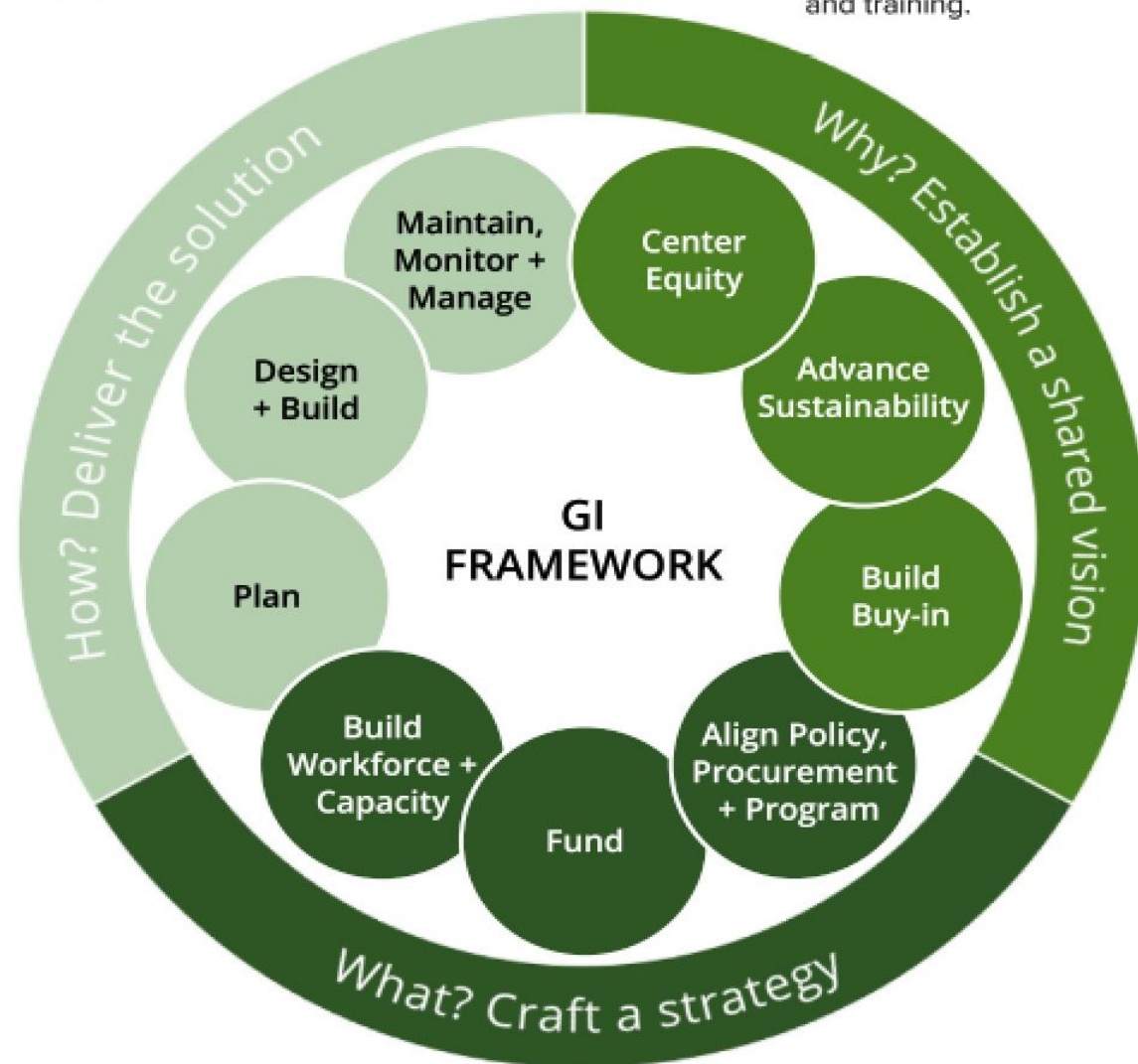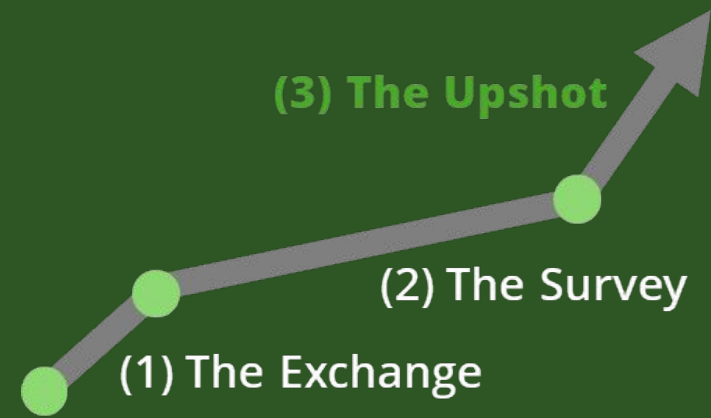
How? Deliver the Solution

7
Plan

This topic is dedicated to strategically planning GSI. It involves determining optimal locations; assessing quantity and types of GSI; integrating equity considerations; planning for lasting community benefits; mitigating displacement risks; defining design considerations; and aligning GSI with broader planning efforts.

8 (In progress)
Design + Build

This topic revolves around the design and construction of GSI. It includes national and local design standards; designing for lasting community benefits; reducing the chances of community displacement; involving communities in the design process; implementing best practices for GSI construction; addressing design barriers; fostering innovation; and designing with maintenance in mind.

9
Maintain, Monitor + Manage

This topic includes understanding asset management systems and their benefits; planning and executing maintenance strategies; addressing funding for monitoring and maintenance; considering data standardization; and delving into various elements such as lifecycle costs, criticality, levels of service, capital project rehabilitation, public and private inspections, and ongoing monitoring efforts.

GI FRAMEWORK — Center Equity, Advance Sustainability, Build Buy-in, Align Policy, Procurement + Program, Fund, Build Workforce + Capacity, Plan, Design + Build, Maintain, Monitor + Manage. Why? Establish a shared vision / What? Craft a strategy / How? Deliver the solution

40

(3) The Upshot

(2) The Survey

(1) The Exchange

What Can You Do?

- **Involve more sectors: expand membership**
- **Develop an organizing framework for GSI**
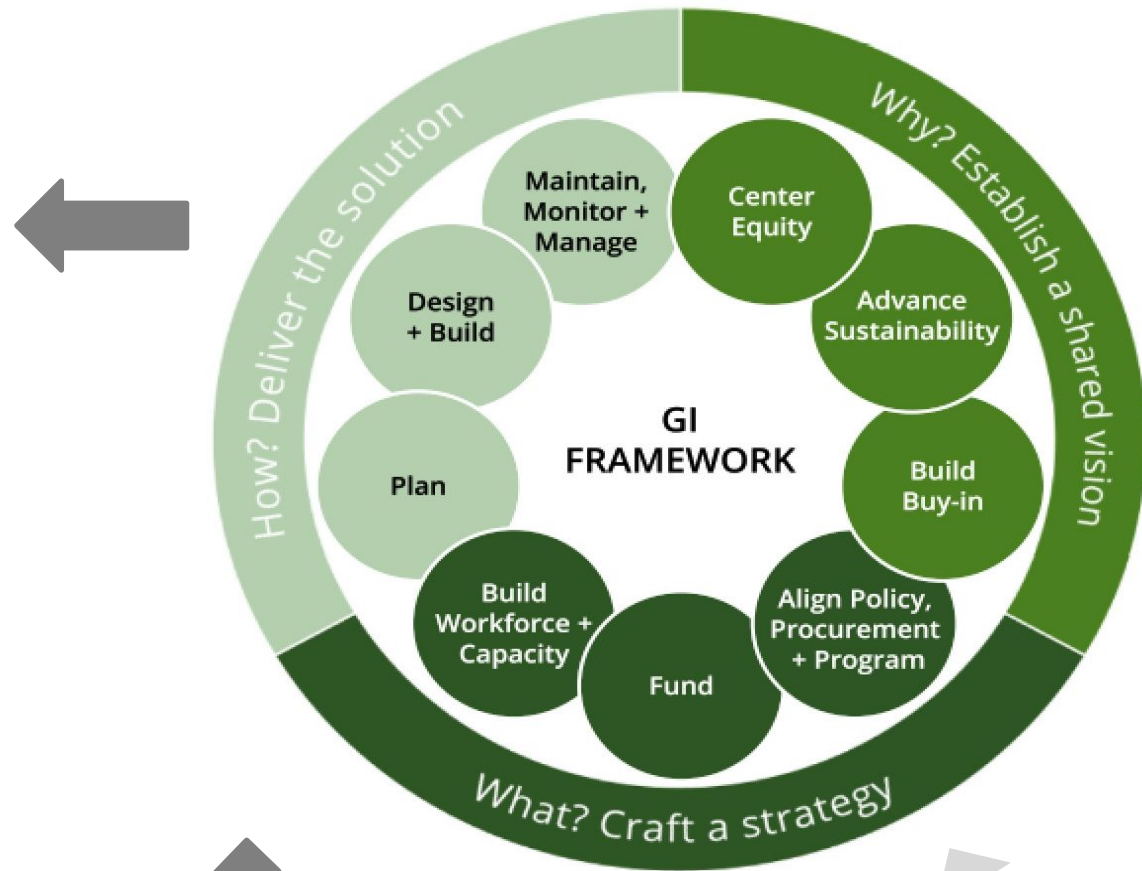- **Use that framework to identify knowledge gaps and to develop programming to address them**
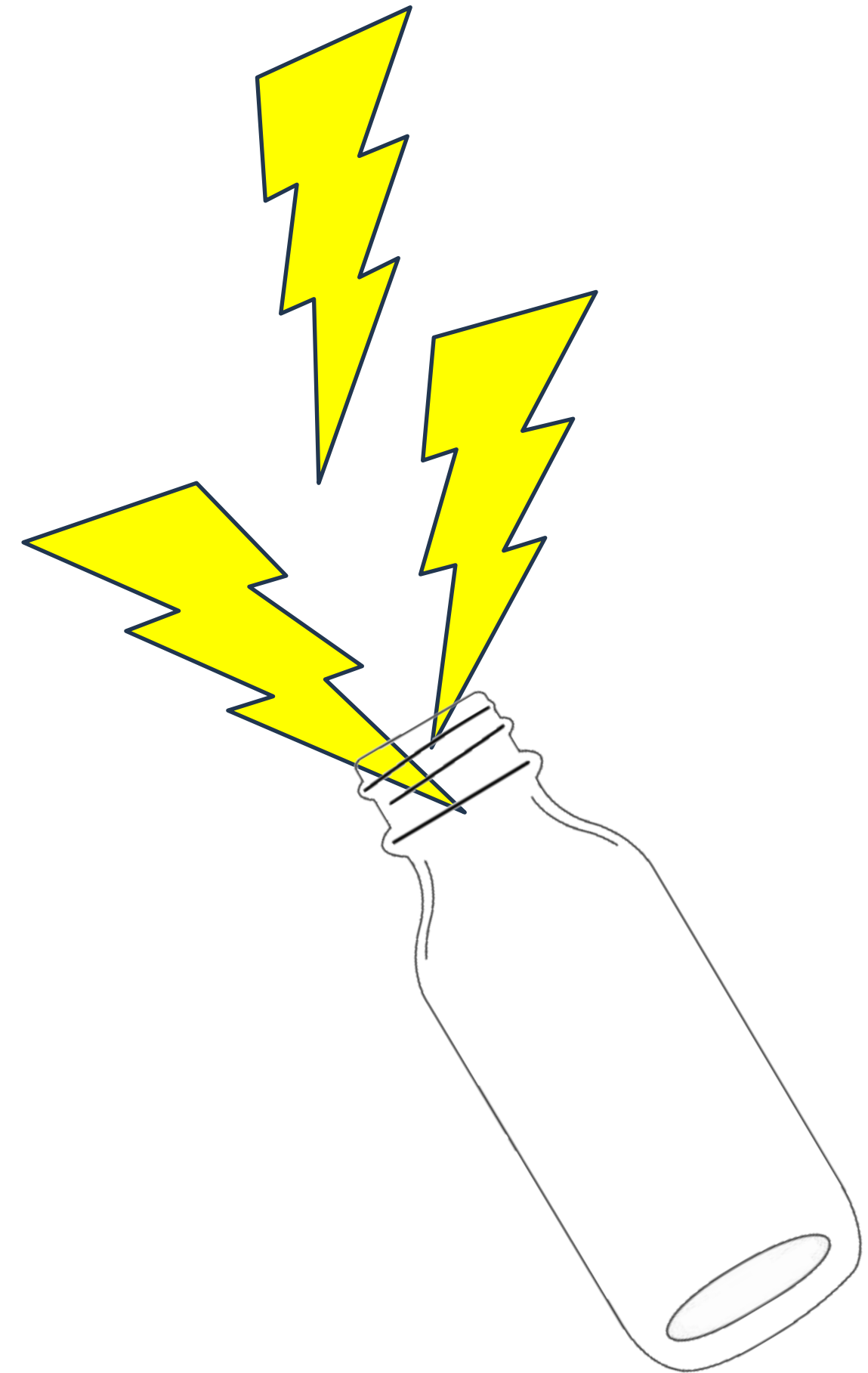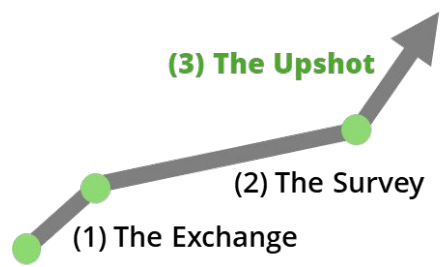
Programming that Fills Framework Gaps

1 **FOUNDATIONAL COURSES / PEER LEARNING EXPERIENCES** (**for beginners**)

- **GSI Foundations**: A survey of the Framework's core topics.
- **GSI & Equity**: Organized around the Exchange's seven Equity Goals and 4 identified types of equity (i.e., identity, power, process, spatial
- **Catalyst 1:** Designed to help jurisdictions in the early stages of developing a GSI program climb the learning curve more quickly.
- **Making Your Case with the GSI Impact Hub:** A short course on using GSI Impact Hub to evaluate a project's co-benefits and make the case for its construction, i.e., "build buy-in" with decision-makers.

2 **ANNUAL EDUCATIONAL RESOURCES & NEEDS (ERN) SURVEY**

(Used to identify current needs / expertise of **advanced & intermediate practitioners** across the 9 Framework topics)
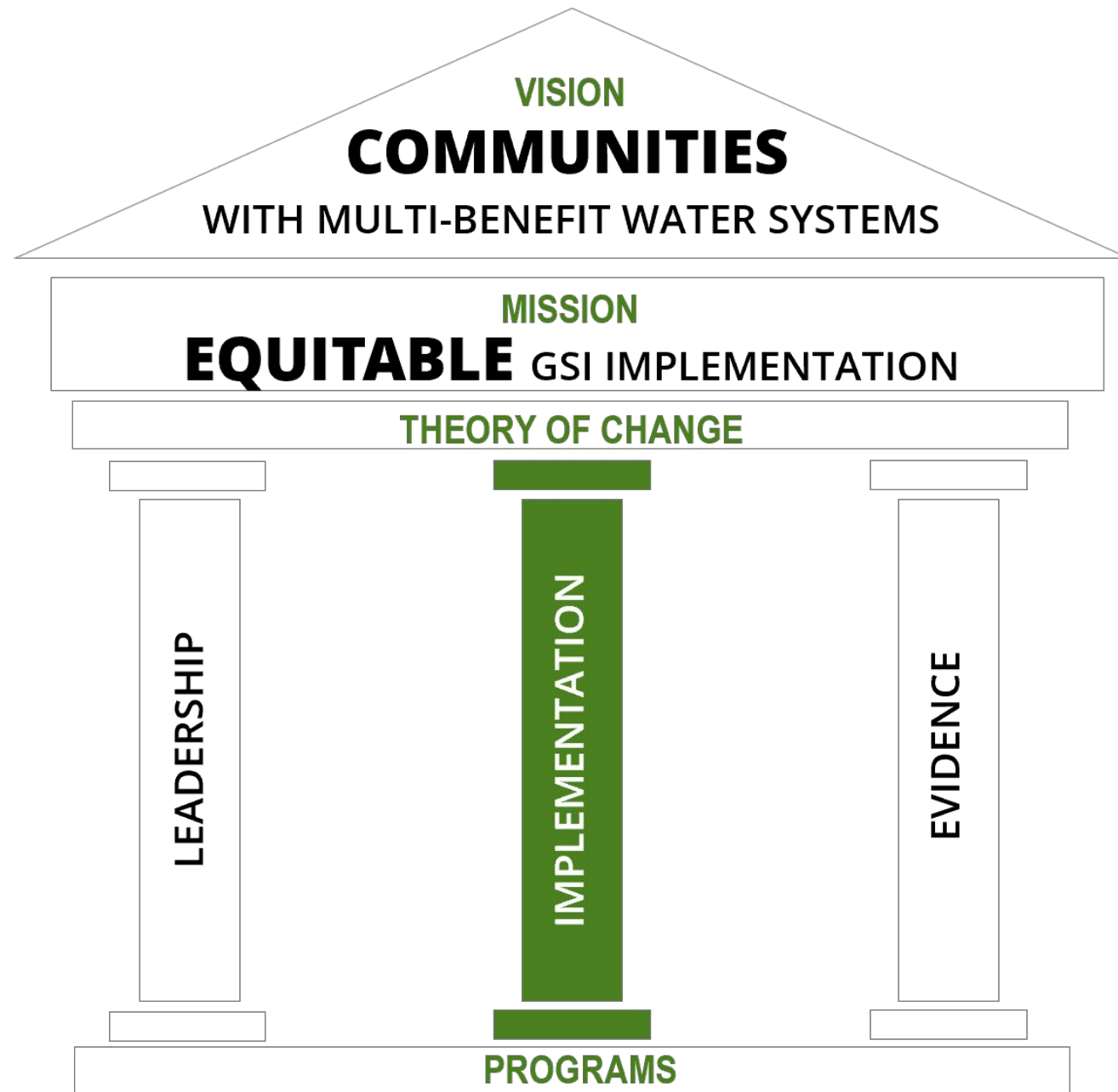
1. Where do you have **expertise & or resources** to share?
2. Where are you **knowledgeable but want to learn** more (**advanced**)?
3. Where are you **less knowledgeable and want to learn more** (**intermediate)**?

GI Framework circle

Why? Establish a shared vision
How? Deliver the solution
What? Craft a strategy

- Center Equity
- Advance Sustainability
- Build Buy-in
- Align Policy, Procurement + Program
- Fund
- Build Workforce + Capacity
- Plan
- Design + Build
- Maintain, Monitor + Manage

GI FRAMEWORK

3 **PROGRAMMING THAT ALIGNS WITH ERN SURVEY RESULTS:**

1. **ROUNDTABLES** of those with expertise/resources to outline the topics most popular with advanced & intermediate practitioners
2. **FOR ADVANCED PRACTITIONERS** (2025)
   - **Peer Learning Circles & Webinars on**
     - *GSI Maintenance*
     - *Using GSI to Advance Sustainability*
3. **FOR INTERMEDIATE PRACTITIONERS** (2025)
   - **Catalyst 2**: Designed to help intermediate level jurisdictions scale
   - Short training modules on:
     - *GSI Procurement*
     - *Building the GSI workforce*

4 **REPURPOSING PROGRAMMING CONTENT TO FURTHER DEVELOP THE FRAMEWORK OF GSI PRACTICE & GI LIBRARY**

- Establishing/updating principles and best practices.
- Incorporating new case studies.
- Cataloging project images, specifications and details in the GI Library.

VISION
COMMUNITIES
WITH MULTI-BENEFIT WATER SYSTEMS

MISSION
EQUITABLE GSI IMPLEMENTATION

THEORY OF CHANGE

LEADERSHIP

IMPLEMENTATION

EVIDENCE

PROGRAMS

Framing:
- Framework of GSI Practice
- Peer Learning
- Educ. Res. & Needs Survey
- Re-grant Program
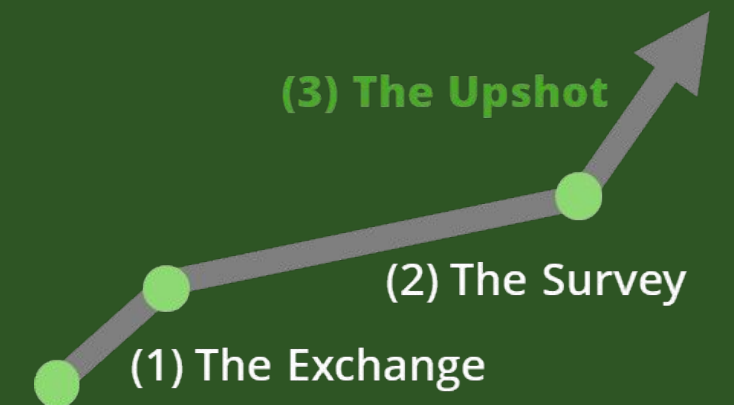- Partnership Projects

Training:
- Training Courses
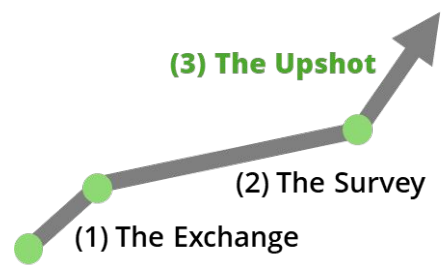- Webinars
- Annual Meeting
- Catalyst Program

Making the Evidentiary Case
- GI Library
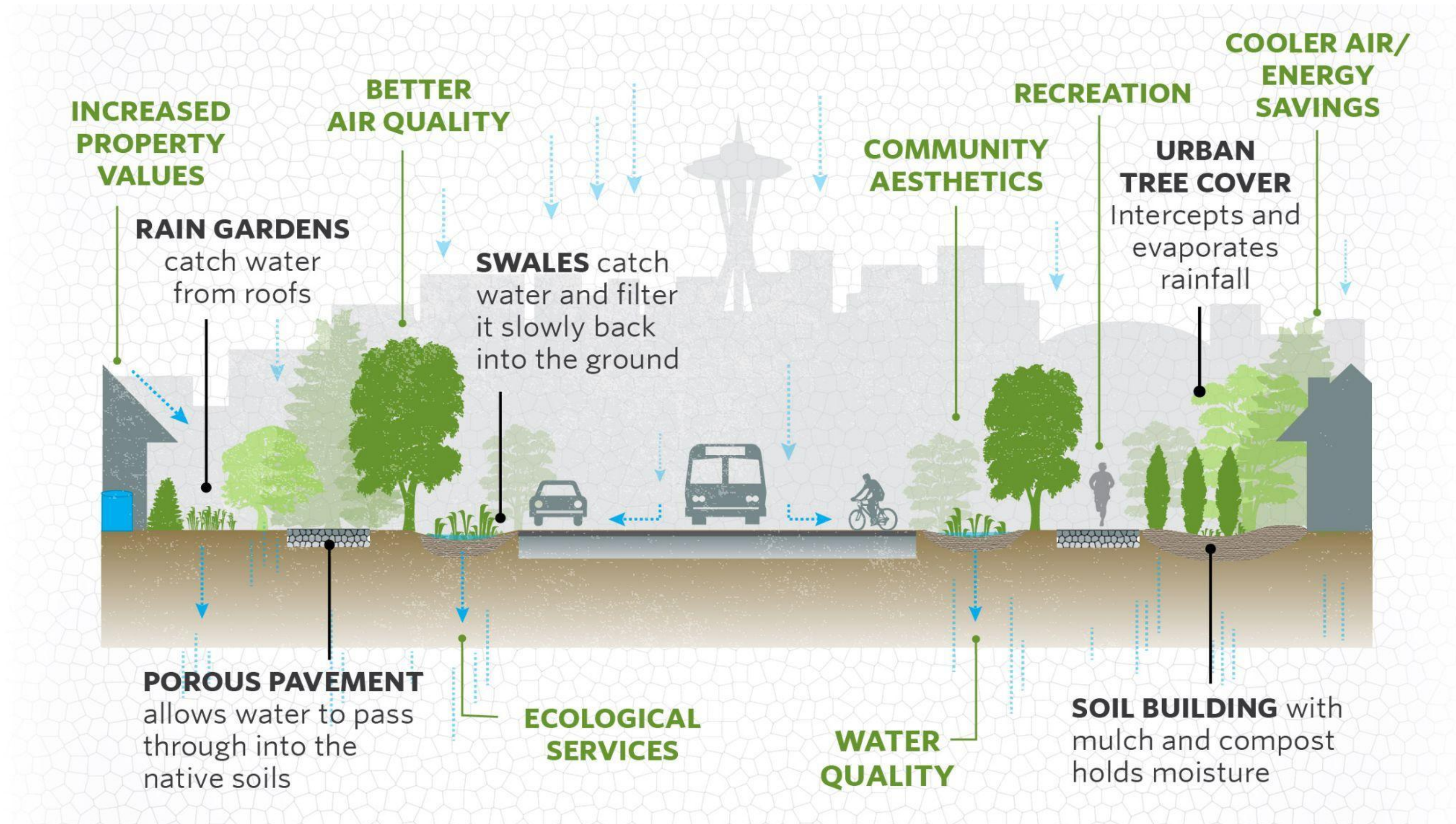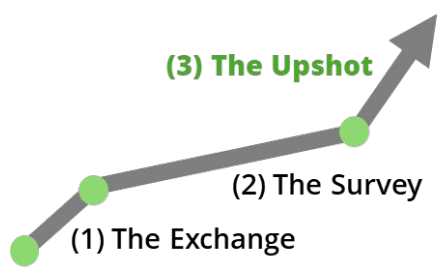- The State of Public Sector GSI
- GSI Impact Hub

Theory of Change

(3) The Upshot

(2) The Survey

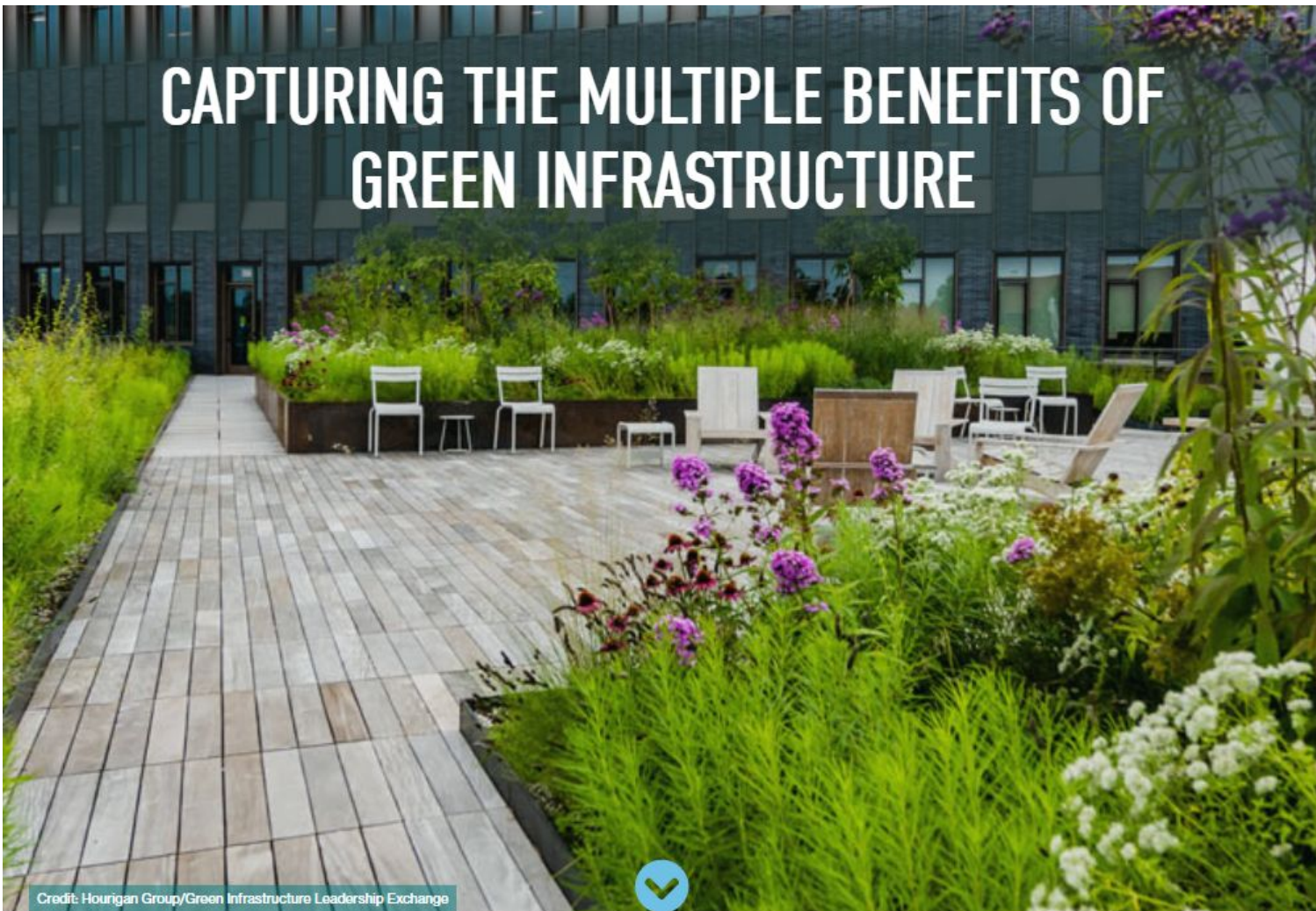(1) The Exchange

What do we mean by co-benefits?

GSI Impact Hub
Quantify & Communicate GSI Co-Benefits

CAPTURING THE MULTIPLE BENEFITS OF GREEN INFRASTRUCTURE

Credit: Hourigan Group/Green Infrastructure Leadership Exchange
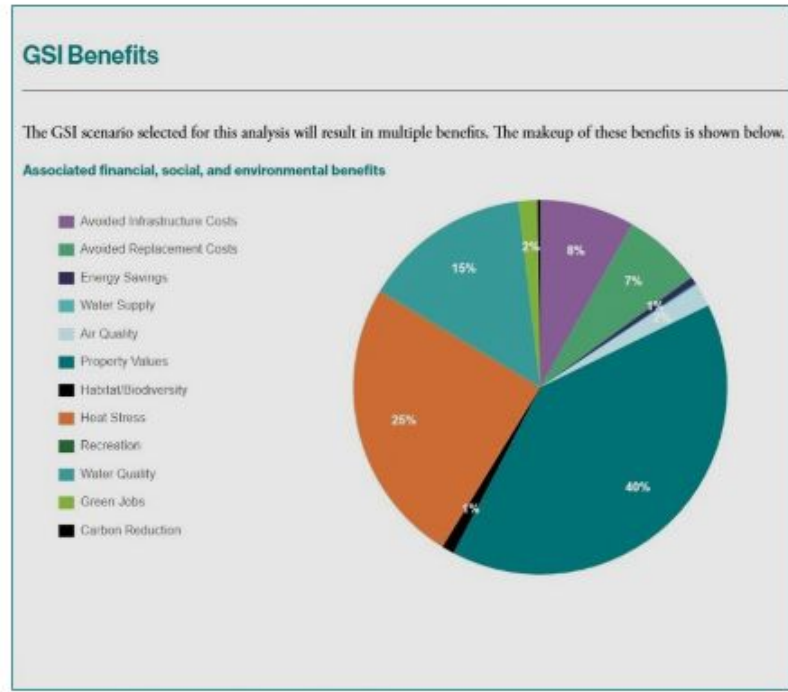
GSI Impact Calculator

Quantify the benefits and costs of GSI projects with our online calculator.

GSI Resources

Explore in-depth guides and other resources that examine co-benefits of GSI, including around flood, heat, and jobs.

The GSI Impact Hub is an interactive platform with a suite of resources and tools to help quantify and communicate the multiple benefits – or co-benefits – of green stormwater infrastructure (GSI) and assist in siting and planning projects to achieve the greatest impact.

The Nature Conservancy

ONE WATER ECON

GREEN INFRASTRUCTURE LEADERSHIP EXCHANGE

Sarah Bloom, San Francisco Public Utilities Commission
Stephanie Chiorean, Philadelphia Water Department
Dana de Leon, Tacoma Water
Chris Hartman, Northeast Ohio Regional Sewer District
Matt Johnson, Washington D.C. DOEE
Nat Lichten, Washington D.C. DOEE
Irene Ogata, Tucson Water
Beatrice Ohene-Okae, Washington D.C. DOEE
Brent Peterson, Washington D.C. DOEE
Kerry Rubin, Portland Bureau of Environmental Services
Holly Sauter, Metropolitan Water Reclamation District of Greater Chicago
Elizabeth Svekla, Philadelphia Water Department
Tracy Tackett, Seattle Public Utilities

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Membership
Open to practitioners across sectors in the U.S. & Canada.

BENEFITS

Exchange Members can Expect:

Peer Network

Exclusive access to the community portal for GI Library and peer learning, offering engagement opportunities through regional groups and mentorships.

Free Learning

Free professional development courses to earn CEUs.

Annual Convening

Opportunity to connect in-person and see cutting edge GSI practices first-hand.

Job Listings

Free job opening advertisements to further your professional reach.

Monthly Updates

Monthly newsletter and special event updates.

Task Force Roles

Opportunities to participate in industry-focused task forces and special committees.

Membership dues range from $1,300 to $4,300 annually for local governments, based on population. Other sectors' dues are based on annual revenue. More information is available at: https://giexchange.org/membership.

SCAN TO LEARN MORE

Thank you for the privilege of your time and attention!

JOIN OUR NEWSLETTER from the bottom of any page on our website:
https://giexchange.org/

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Phone & SMS: 410-657-2657

Annual Meeting Revelers, Philadelphia, PA (2023)