Overview

Defining LID+GSI

LID+GSI Survey Results

Resources in Development
- Code Audit
- Photo Library
- GSI Maintenance

Definition of LID+GSI
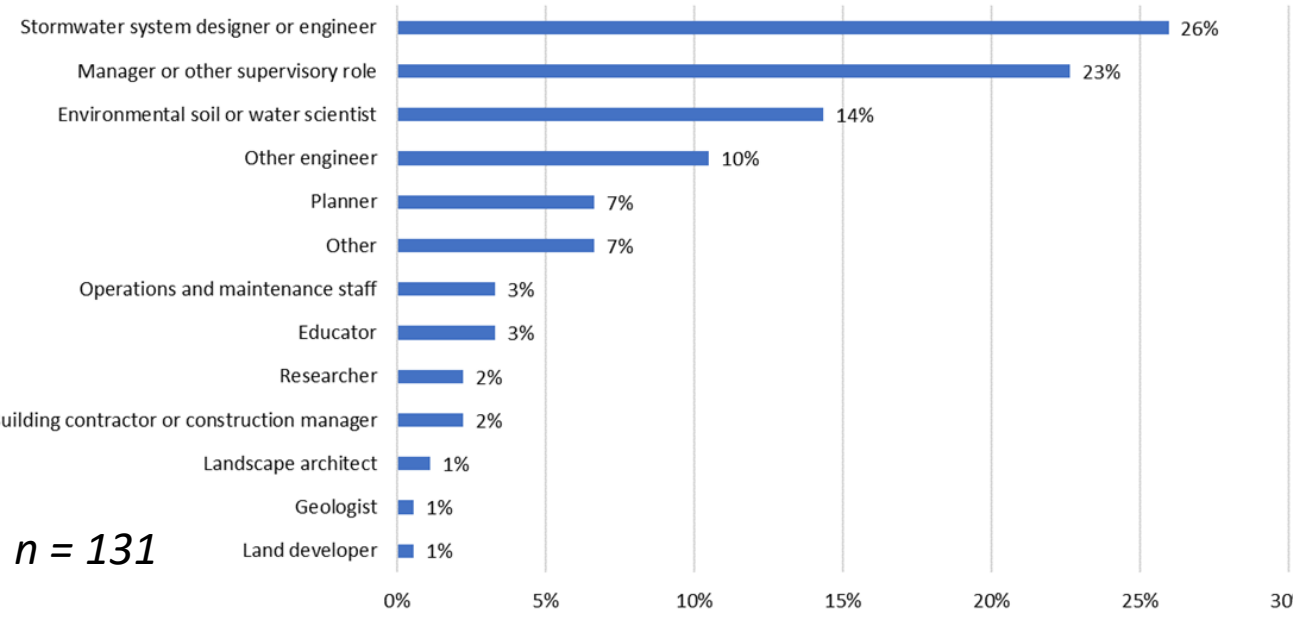
LID: (Low Impact Development) a comprehensive <u>*site* **planning**</u> *and* <u>***design***</u> <u>*strategy*</u> *for* **maintaining the predevelopment hydrologic regime** *(peak discharge rate, timing, and volume) and mitigating pollutant loads from land development using* **distributed structural and non-structural design techniques**. The goals of LID are to <u>**avoid and minimize**</u> additional runoff produced from site development.

GSI: (green stormwater infrastructure) includes the range of structural and non-structural retention and detention measures *that* infiltrate, evaporate, detain, filter, or store *stormwater runoff closer to the source.* The goal of GSI is to <u>**mitigate**</u> the runoff produced from site development.
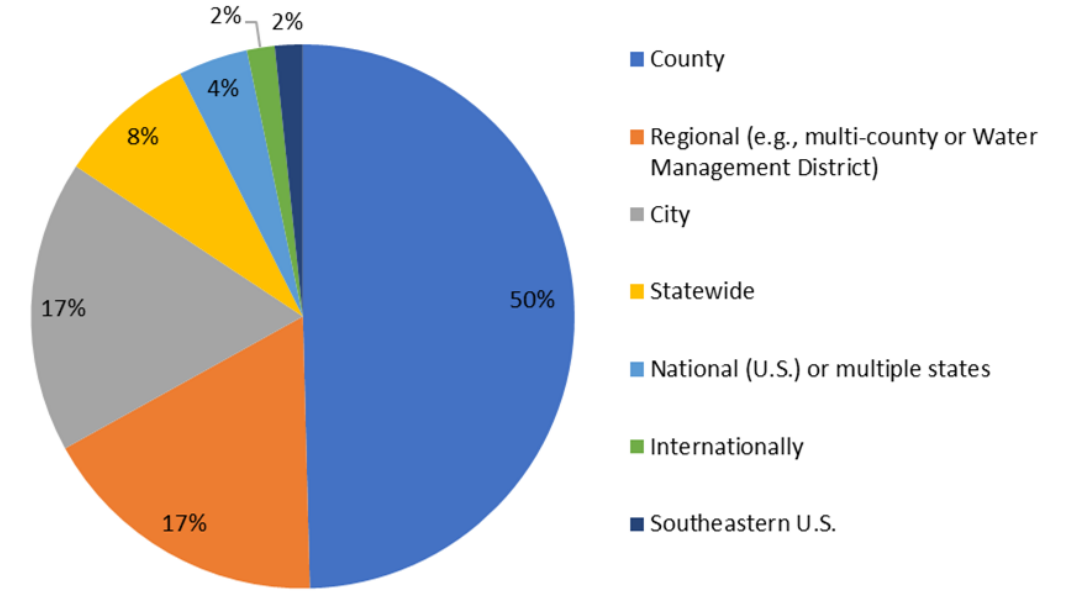
Together, these are referred to as "**LID+GSI**"

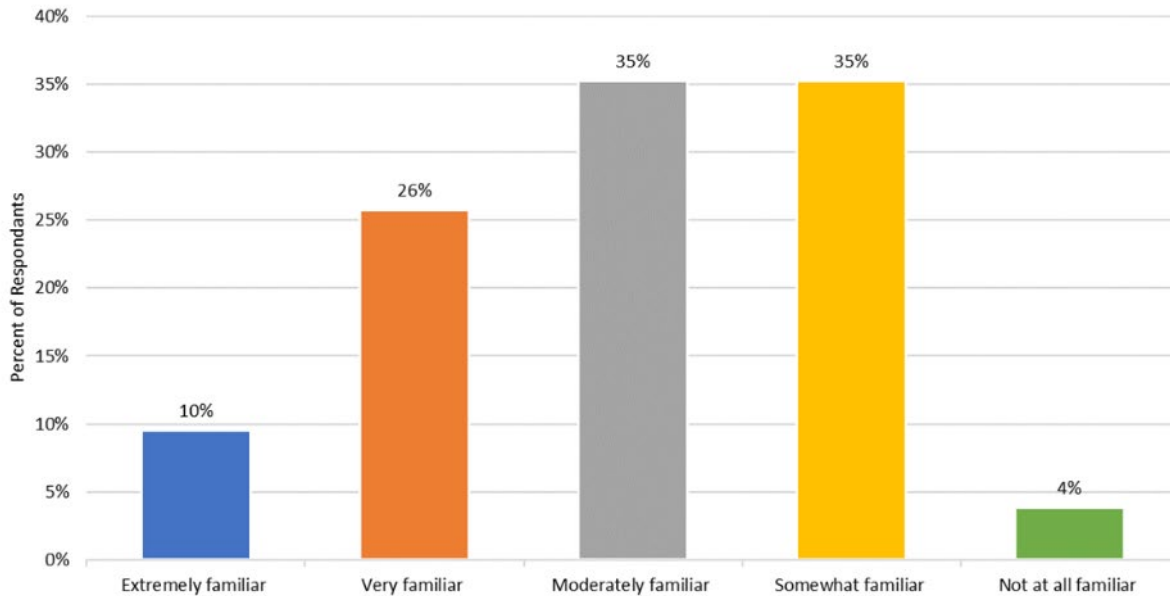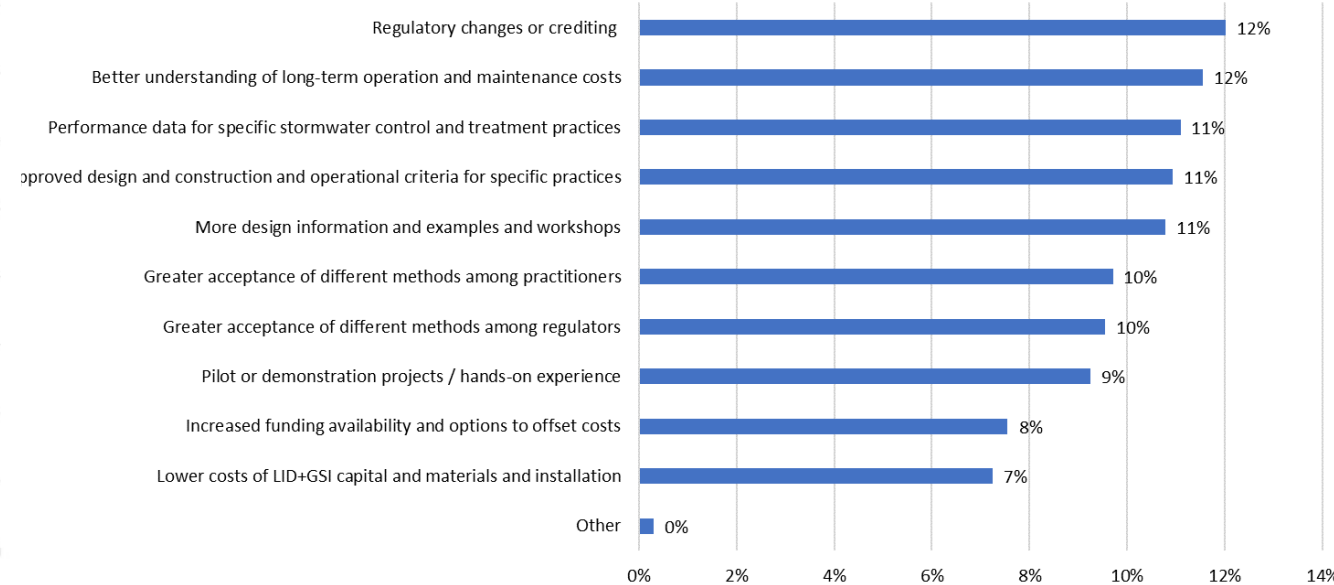## Which of the following describes your profession role or title?

n = 131

Role	Percent
Stormwater system designer or engineer	26%
Manager or other supervisory role	23%
Environmental soil or water scientist	14%
Other engineer	10%
Planner	7%
Other	7%
Operations and maintenance staff	3%
Educator	3%
Researcher	2%
Building contractor or construction manager	2%
Landscape architect	1%
Geologist	1%
Land developer	1%

At what geographic scale do you currently work?

Scale	Percent
County	50%
Regional (e.g., multi-county or Water Management District)	17%
City	17%
Statewide	8%
National (U.S.) or multiple states	4%
Internationally	2%
Southeastern U.S.	2%

How familiar are you with general LID+GSI concepts?

Familiarity	Percent of Respondants
Extremely familiar	10%
Very familiar	26%
Moderately familiar	35%
Somewhat familiar	35%
Not at all familiar	4%

Which of the following do you think is needed to promote broader implementation of LID+GSI Florida?

Item	Percent
Regulatory changes or crediting	12%
Better understanding of long-term operation and maintenance costs	12%
Performance data for specific stormwater control and treatment practices	11%
Improved design and construction and operational criteria for specific practices	11%
More design information and examples and workshops	11%
Greater acceptance of different methods among practitioners	10%
Greater acceptance of different methods among regulators	10%
Pilot or demonstration projects / hands-on experience	9%
Increased funding availability and options to offset costs	8%
Lower costs of LID+GSI capital and materials and installation	7%
Other	0%

Code Audit

- Identify barriers in local codes

- Walk through sections of Code

- WI Sea Grant Tool

- Center for Watershed Protection Tool

- Add coastal & karst material

- Release mid-2022

- 3-6 months

- UF & TNC

TACKLING BARRIERS TO Green Infrastructure

AN AUDIT OF LOCAL CODES AND ORDINANCES

WISCONSIN SEA GRANT WITH SUPPORT FROM THE NOAA COASTAL STORMS PROGRAM
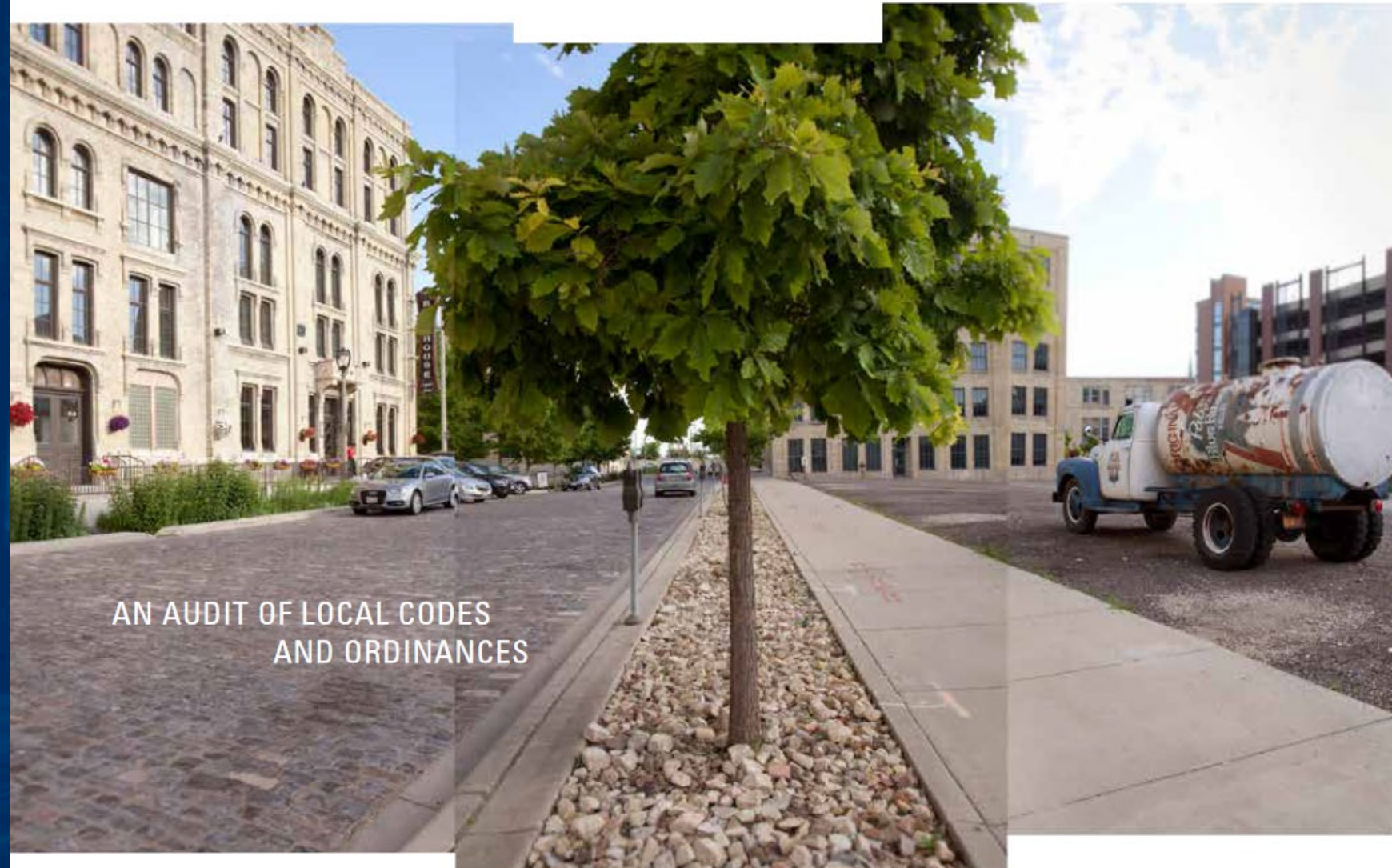
Code Audit

Enabling Low Impact Development and Green Stormwater Infrastructure

A COMMUNITY SCOPING AND ORDINANCE AUDIT TOOL FOR FLORIDA COUNTIES AND MUNICIPALITIES

Points	Criteria	Example Code Requirements
4	Practice is clearly described and approved or is allowed with design approval.	Where feasible, parking lot islands and perimeter landscaped areas shall be designed and installed to function as stormwater management areas, following design standards for bioretention found in the Stormwater Design Manual. If not feasible, native plants, suitable for the site shall be used.
3	Practice is encouraged, but some ambiguity or potential conflict exists.	Parking lot islands and perimeter landscaped areas are encouraged to be designed as part of the site's stormwater management system, based on bioretention standards in the Stormwater Design Manual. Trees must be planted at a maximum interval of 20 feet.
2	Practice is mentioned, but without standards or guidance for use.	Landscaped areas in parking lot perimeters and islands may be designed and used as stormwater bioretention areas.
1	Code is silent or significant limits exist, but practice could possibly be used.	Landscaping in parking lot islands and perimeters must achieve a minimum of 75% cover within two years of planting.
0	Practice is prohibited or very unlikely to be approved.	Parking lot perimeters shall be graded into a berm with a minimum slope of 2:1, covered with landscaping that will form a dense evergreen screen within tow years of planting.

Local Government Planning and Policy
- Policy
- Comprehensive Plan
- Zoning
- Community

Protecting Nature
- Natural Infrastructure
- Trees
- Coastal
- Sensitive Groundwater Areas

Stormwater and Water Quality
- Pollutant Reduction
- Stormwater Management

The Built Environment
- Buildings and Landscaping
- Streets
- Parking
- Permeable Hardscape
- Construction
- Subdivisions and Greenfield

Code Audit: Scoring Examples

| B8. Do the goals, objectives, and policies of the future land use element of the comprehensive plan include protection of natural areas and open spaces?			
Tips	Code References	Notes, Ideas and Strategies	Score
Protecting remaining natural areas inside urban services area should be a stated priority as well as preventing urban sprawl into rural areas.	Comprehensive Plan, Conservation and Open Space Element, and Objective 1.2 (p. 248) The goal of this element is "to conserve, manage, and restore or enhance the natural and human-related resources to ensure long-term environmental quality for the future."	Several areas in the comprehensive plan refer to protecting natural areas and open space. No further action is needed.	3

G2. Are sand dunes and other coastal terrestrial habitats protected from development in code?			
Tips	Code References	Notes, Ideas and Strategies	Score
Requiring setbacks for new or expanded structures and impervious surfaces, and limitations on clearing or grading near protected areas are common provisions. Martin County's Shoreline Protection Zones and related Preserve Area Management Plans are good examples.	Code Chapter 10, Building Regulations, Article V Coastal Construction, Sec. 10: Construction shall be located a sufficient distance landward of the beach to permit natural shoreline fluctuations and to preserve dune stability Article X Resource Protection, Division 2. Dunes, Sec.26: It shall be unlawful to remove, cover, or destroy natural vegetation growing upon any dune within the town without a permit from the town administrator.	Although Code requires development to be "a sufficient distance from the beach", the distance is not specified or required to be set by a qualified person. The prohibition on removing native vegetation on dunes is left to the discretion of the town administrator. This ordinance could be stronger. Discuss options for strengthening these protections with Environmental Protection staff.	1

Code Audit: Summarization

Section Topic	Section	Total Points	Potential Points	Percent of Points Credited	
Local Government Planning and Policy	Policy	0	32	*0%*	
	Comprehensive Plan	0	32	*0%*	
	Zoning	0	24	*0%*	
	Community	0	40	*0%*	
	Average	**0**	**128**		**0%**
Protecting Nature	Natural Infrastructure	0	60	*0%*	
	Trees	0	32	*0%*	
	Coastal	0	32	*0%*	
	Sensitive Groundwater Areas	0	28	*0%*	
	Average	**0**	**152**		**0%**
Stormwater and Water Quality	Pollutant Reduction	0	52	*0%*	
	Stormwater Management	0	80	*0%*	
	Average	**0**	**132**		**0%**
The Built Environment	Buildings and Landscaping	0	108	*0%*	
	Streets	0	76	*0%*	
	Parking	0	72	*0%*	
	Permeable Hardscape	0	28	*0%*	
	Construction	0	44	*0%*	
	Subdivisions and Greenfield	0	32	*0%*	
	Average	**0**	**360**		0%
Average for full audit		**0**	**772**		**0%**

Photo Library

- Partnership: UF & The Nature Conservancy
- Identified 40+ projects statewide (began spring 2021)
- GIS Map with project locations
- Photos (photo essay), links to plans (ERP), available cost information
- Regionally specific (plants)
  - Plant selection tool in development
- Intended to be a tool for ideation and client discussions
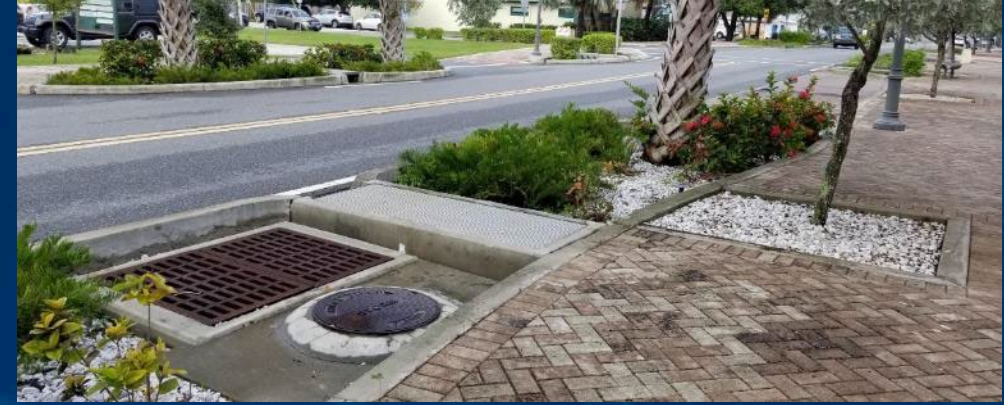
Operation and Maintenance is Key

"Another flaw in the human character is that everybody wants to build and nobody wants to do maintenance."

- Kurt Vonnegut

- Filters clog
- Plants die
- Sediment builds up

GSI Maintenance Trainings

- Projected to start development Spring 2022
- Modeled after GI-BMP program
- Led by County IFAS Extension
- Pilot trainings in Spring/Summer 2022

GSI Maintenance Training

- Target Landscape Industry

- Model after GI-BMP Program

- Florida Friendly Program (Claire Lewis)

- Develop Training Materials – Spring 2022

  - Landscape Professionals
  - Train the Trainer (IFAS Extension)

- Classroom and field portions

- Pilot Summer 2022

- Deliver Fall 2022

Acknowledgements

Collaborators

Jovana Radovanovic (UF Ag & Bio Engineering)

Lynn Jarrett (UF PREC)

Lesley Bertolotti (The Nature Conservancy)

Beth Lewis (The Nature Conservancy)

Claire Lewis (UF Florida Friendly Landscaping)

Jennison Kipp (UF PREC)

Heather Hubbard (UF PREC)

Pilot Communities

60+ Members of GSI Technical Team

Focus Groups

Survey Respondents

Funding

FDEP Division of Water Restoration Assistance

The Nature Conservancy

Questions?

Eban Z. Bean, Ph.D., P.E.

Assistant Professor & Extension Specialist

Urban Water Resources Engineering

ezbean@ufl.edu

@EbanBean