Green Infrastructure Project

February 23, 2024

Purpose

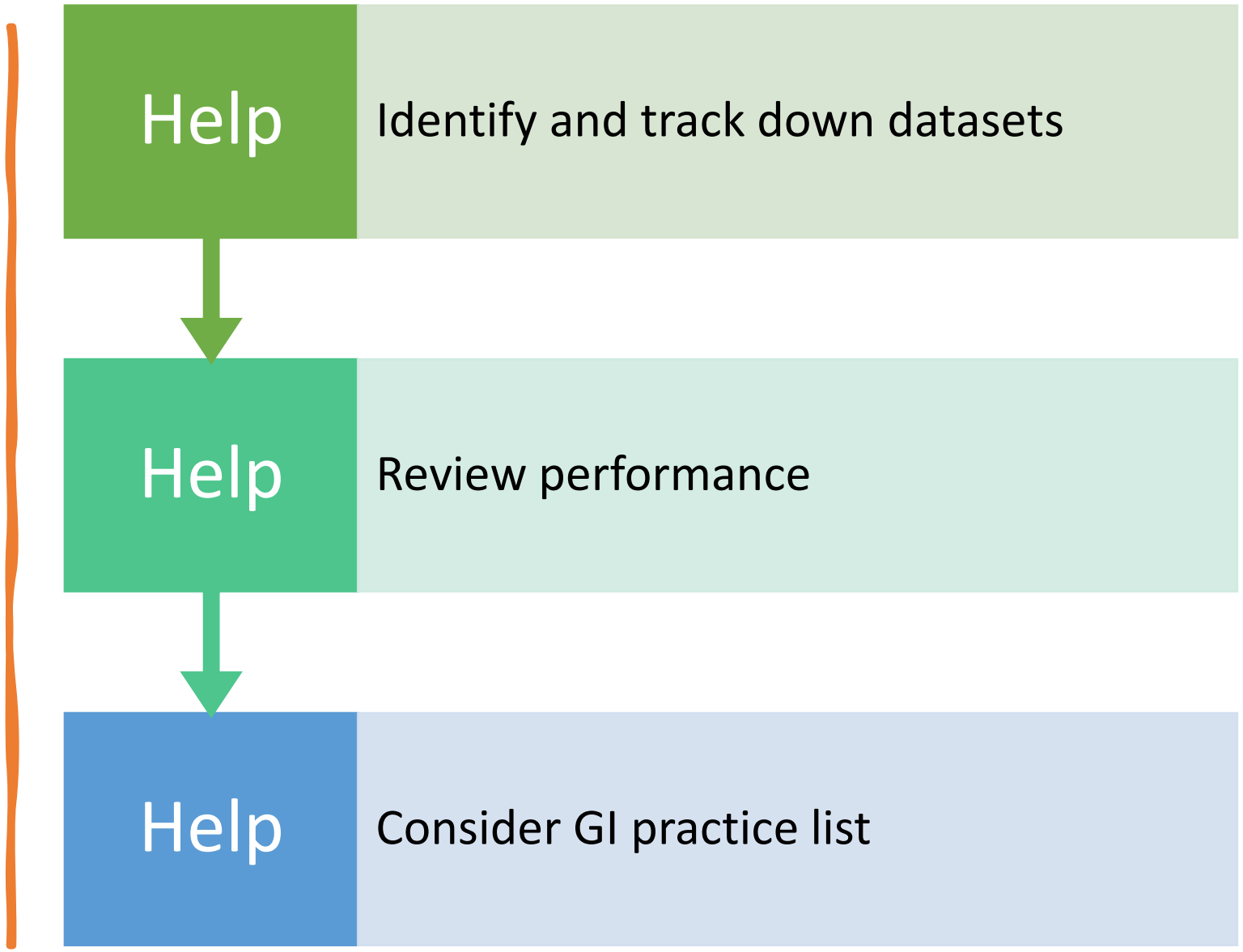
Produce performance database based on local (preferential), state, and national data

Develop recommended GI practice list

Outreach:

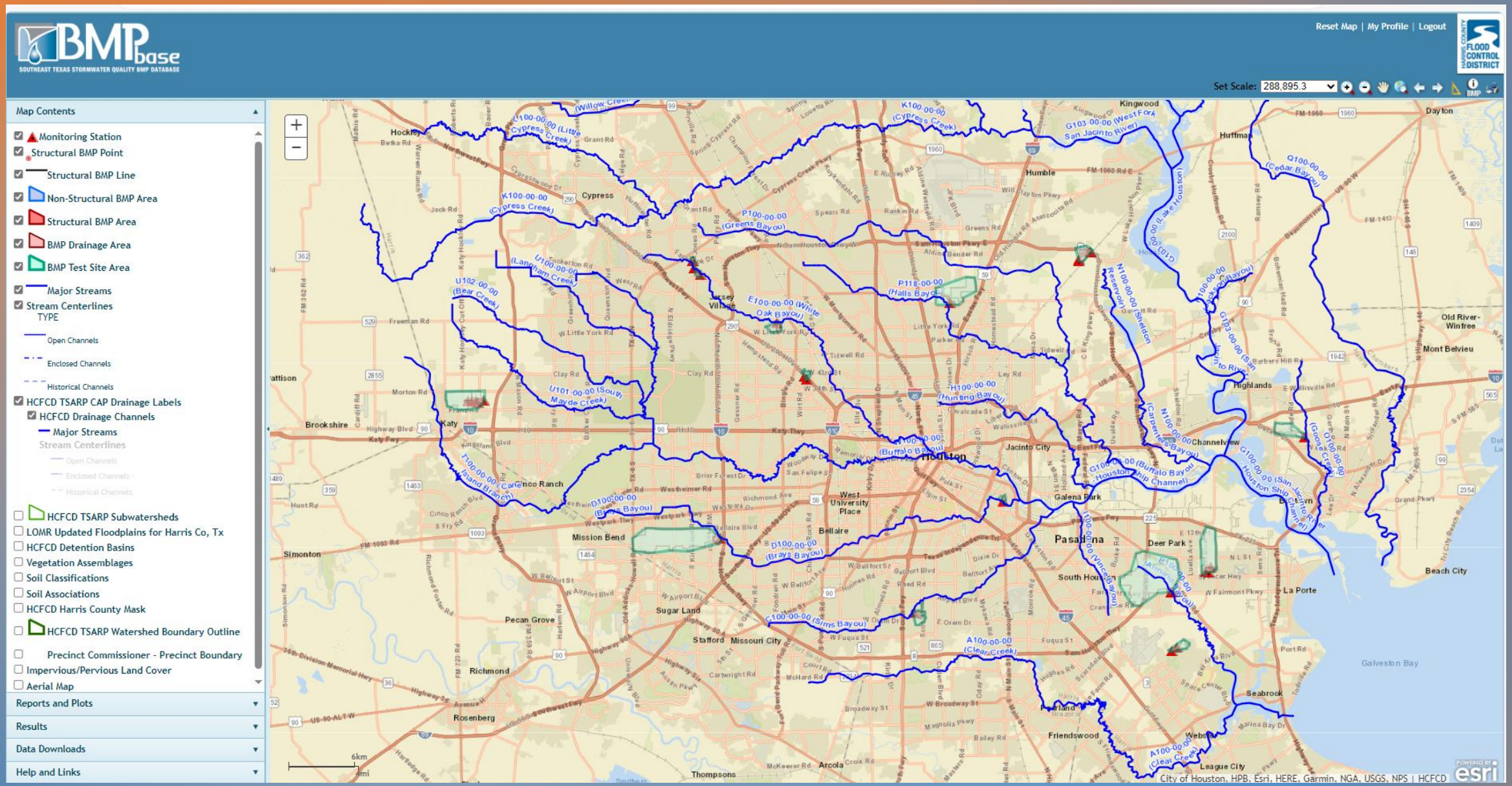
One-on-one meetings	Workshop	Website

Project Committee



Data Review

- HCFCD Stormwater Database
- International Stormwater Database
- Periodical Review

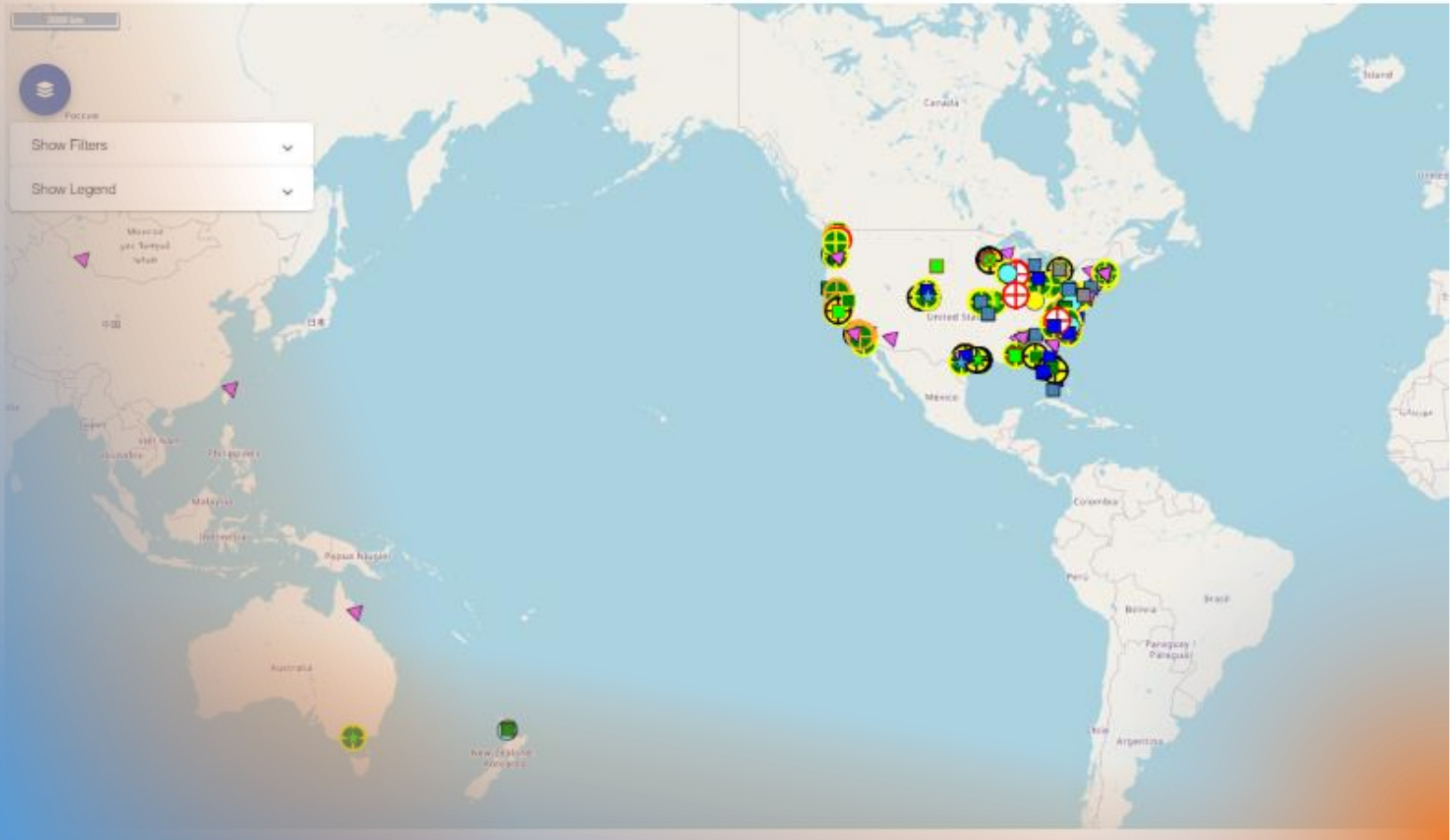

BMPbase
SOUTHEAST TEXAS STORMWATER QUALITY BMP DATABASE
Reset Map | My Profile | Logout
HARRIS COUNTY FLOOD CONTROL DISTRICT
Set Scale: 288,895.3
Map Contents
Monitoring Station
Structural BMP Point
Structural BMP Line
Non-Structural BMP Area
Structural BMP Area
BMP Drainage Area
BMP Test Site Area
Major Streams
Stream Centerlines
TYPE
Open Channels
Enclosed Channels
Historical Channels
HCFCD TSARP CAP Drainage Labels
HCFCD Drainage Channels
Major Streams
Stream Centerlines
Open Channels
Enclosed Channels
Historical Channels
HCFCD TSARP Subwatersheds
LOMR Updated Floodplains for Harris Co, Tx
HCFCD Detention Basins
Vegetation Assemblages
Soil Classifications
Soil Associations
HCFCD Harris County Mask
HCFCD TSARP Watershed Boundary Outline
Precinct Commissioner - Precinct Boundary
Impervious/Pervious Land Cover
Aerial Map
Reports and Plots
Results
Data Downloads
Help and Links
Houston
Pasadena
Cypress
Katy
Jersey Village
Humble
Kingwood
Huffman
Dayton
Highlands
Channelview
Jacinto City
Galena Park
Deer Park
South Houston
La Porte
Beach City
Seabrook
Webster
League City
Friendswood
Pearland
Arcola
Thompsons
Rosenberg
Richmond
Pecan Grove
Sugar Land
Stafford
Missouri City
Mission Bend
Simonton
Brookshire
Hockley
Mont Belvieu
Old River-Winfree
Galveston Bay
6km
4mi
City of Houston, HPB, Esri, HERE, Garmin, NGA, USGS, NPS | HCFCD
esri

INTERNATIONAL STORMWATER BMP DATABASE

HOME AB

Urban Home | Get Data | Submit Data | Reports | Monitoring

BMP Mapping Tool



- Data – U.S. and International Sources
- Worked with database manager for access.
- Selected data from U.S. for relevancy.
- Over 300,000 records.
- Data requirements for inclusion in the database.
- Access database.

Zone 8
Zone 9
Zone 1
Zone 7
Zone 2
Zone 3
Zone 6
Zone 5
Zone 4

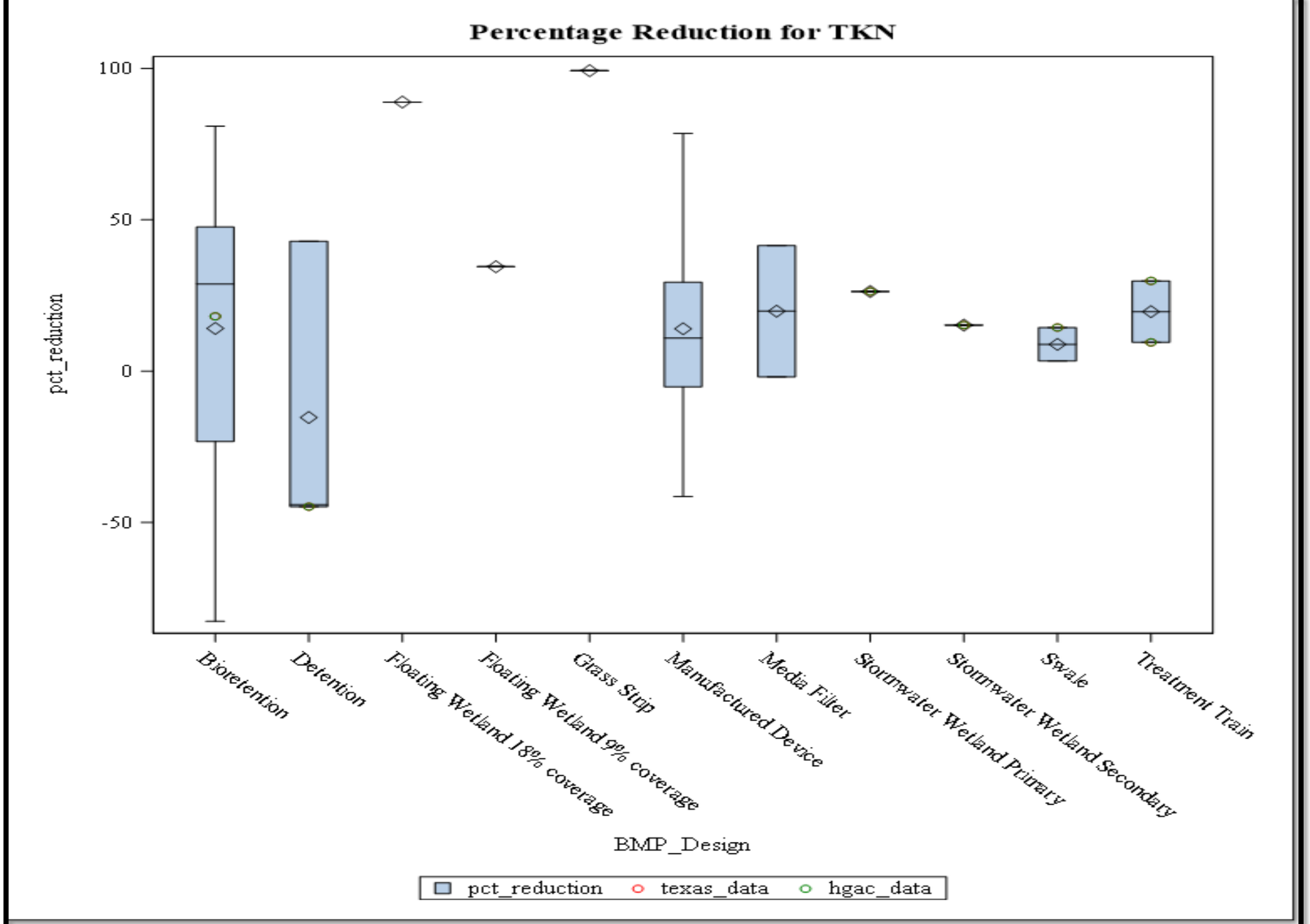
Periodicals/ White Papers

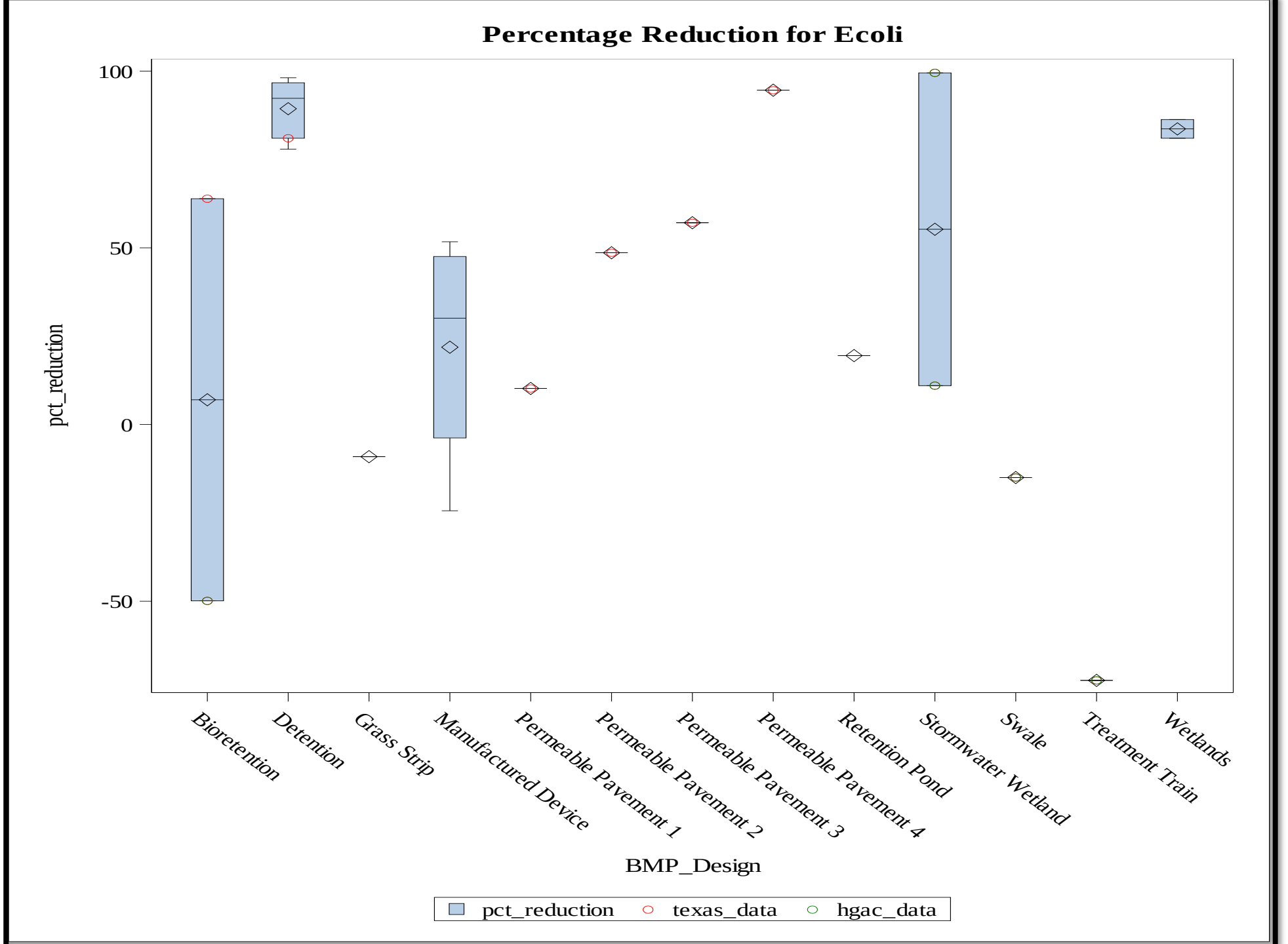
- Reviewed and placed into H-GAC database
- Summary data lack of raw data
- Assistance from Committee to identify and collect local/state datasets
  - Harris County
  - Environmental Institute of Houston
  - Texas AgriLife

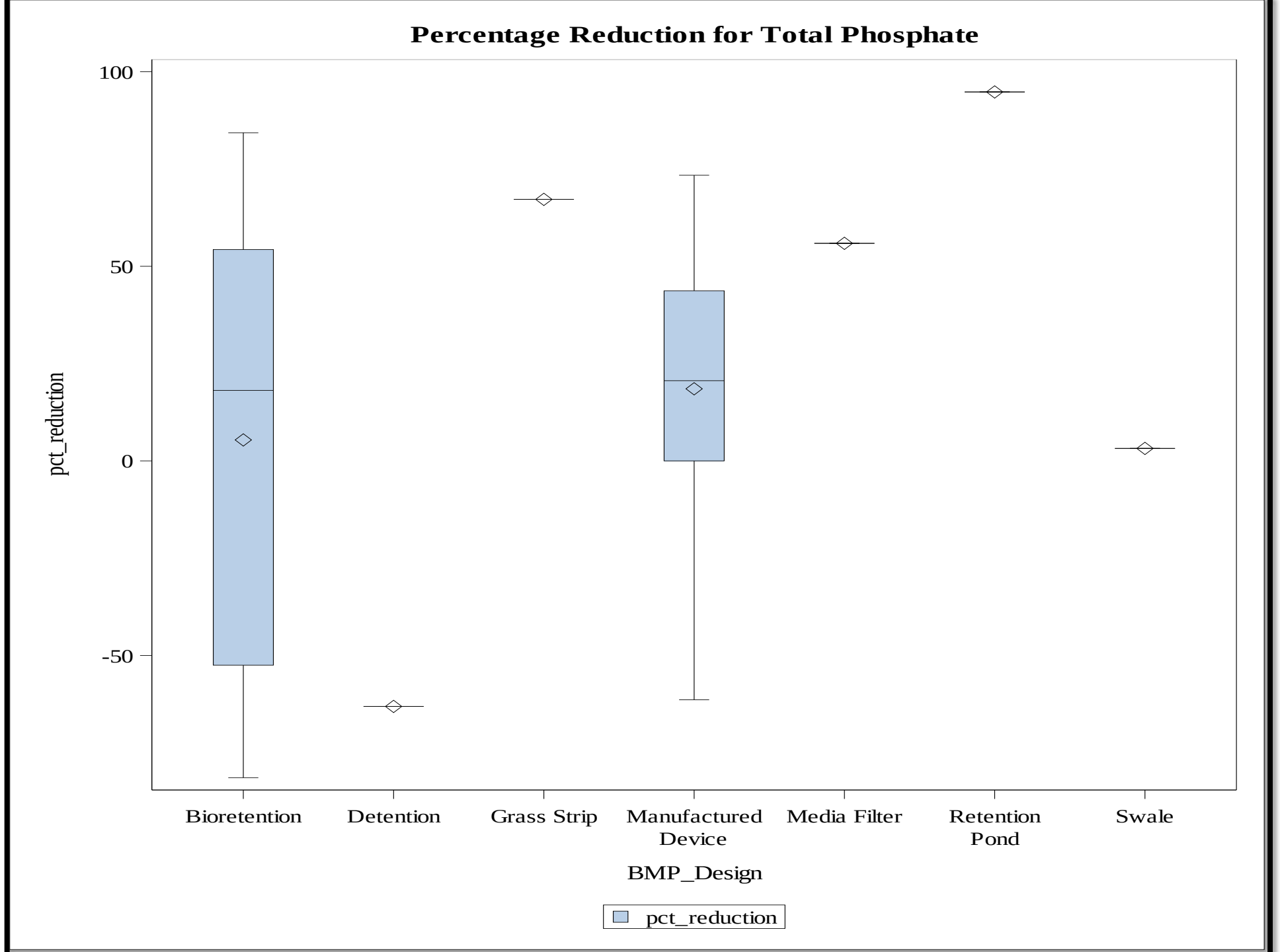
Data Source	Article Title	Notes
Brays Bayou Stormwater Wetland	Sipocz, Marissa. 2008. "Innovative Wetland on Brays Bayou Effectively Removes Bacteria From Polluted Stormwater Runoff". Texas Sea Grant/Texas AgriLife Extension Service. News Release	30 acre contributing watershed. Data local source.
Birnamwood Dr.	Bloom, Michael, Courtney Gerken. 2017. Results of Water Quality Monitoring of the Birnamwood Drive Low Impact Development Project. R.G. Miller Engineers. White Paper prepared for the Harris County Engineering Department. July 2017.	Birnamwood drive project was a linear treatment train consisting of road inlets vegetative swale which outfalled to a bioretention area. Three points were set u capture flow and water quality parameters, inlet to swale, swale outfall/bioretention inlet, and bioretention outfall. Data local source.
Dallas Urban Center Stormwater BMPs	Jaber, Fouad, 2015. Dalla Urban Center Stormwater BMPs. Final Report. Texas Commission on Environmental Quality. August 14, 2015.	Ave Total loads calculated for report, i.e. concentration times volume. State dat set.
University of Texas Recreation Park MD Anderson Campus Wetland	Taylor, Christie, 2020. Initiating Water Quality Sampling of Stormwater Treatment Wetlands in Galveston Bay Watershed. Final Report to the Texas General Land Office Coastal Mangement Program Cycle 23. Texas A&M AgriLife Extension Service. August 2020.	Report covers three stormwater wetlands. Flow was not captured at the inlet o outfall. Data local source.
Exploration Green Recreation Park Phase 1 Stormwater Wetland	Taylor, Christie, 2020. Initiating Water Quality Sampling of Stormwater Treatment Wetlands in Galveston Bay Watershed. Final Report to the Texas General Land Office Coastal Mangement Program Cycle 23. Texas A&M AgriLife Extension Service. August 2020.	Report covers three stormwater wetlands. Flow was not captured at the inlet o outfall. Data local source.
Proton Therapy Parking Lot Expansion Wetland Basin MD Anderson South Campus	Taylor, Christie, 2020. Initiating Water Quality Sampling of Stormwater Treatment Wetlands in Galveston Bay Watershed. Final Report to the Texas General Land Office Coastal Mangement Program Cycle 23. Texas A&M AgriLife Extension Service. August 2020.	Report covers three stormwater wetlands. Flow was not captured at the inlet o outfall. Data local source.
EIH UHCL Wetland	EIH, 2014. Armand Bayou Water Quality Improvement Grant: UHCL Created Stormwater Treatment Wetland	Study looked at three areas: 1. Pre and Post Construction, 2. Reused of WWTF effluent, 3. Solar Pump system bringing bayou water through wetland. Only use resue that focused on nutrients. Some evidence Pre vs. Post improvement in bacteria. 3 sample events with 3 replicate samples taken at each event (n=9). D local source.
Floating Wetland Retrofit North Carolina	Hunt, III William F., Ryan J. Winston, Shawn G. Kennedy, 2012. Evaluation of Floating Wetland Islands (FWI) as a Retrofit to Existing Stormwater Detention Basins. Final Report. Submitted to NC Department of Environment and Natural Resources. Biological and Agricultural Engineering, NC State University. March 22, 2012.	Project studied two detention basins pre-retrofit and post-retrofit for Floating Wetlands. National data set.

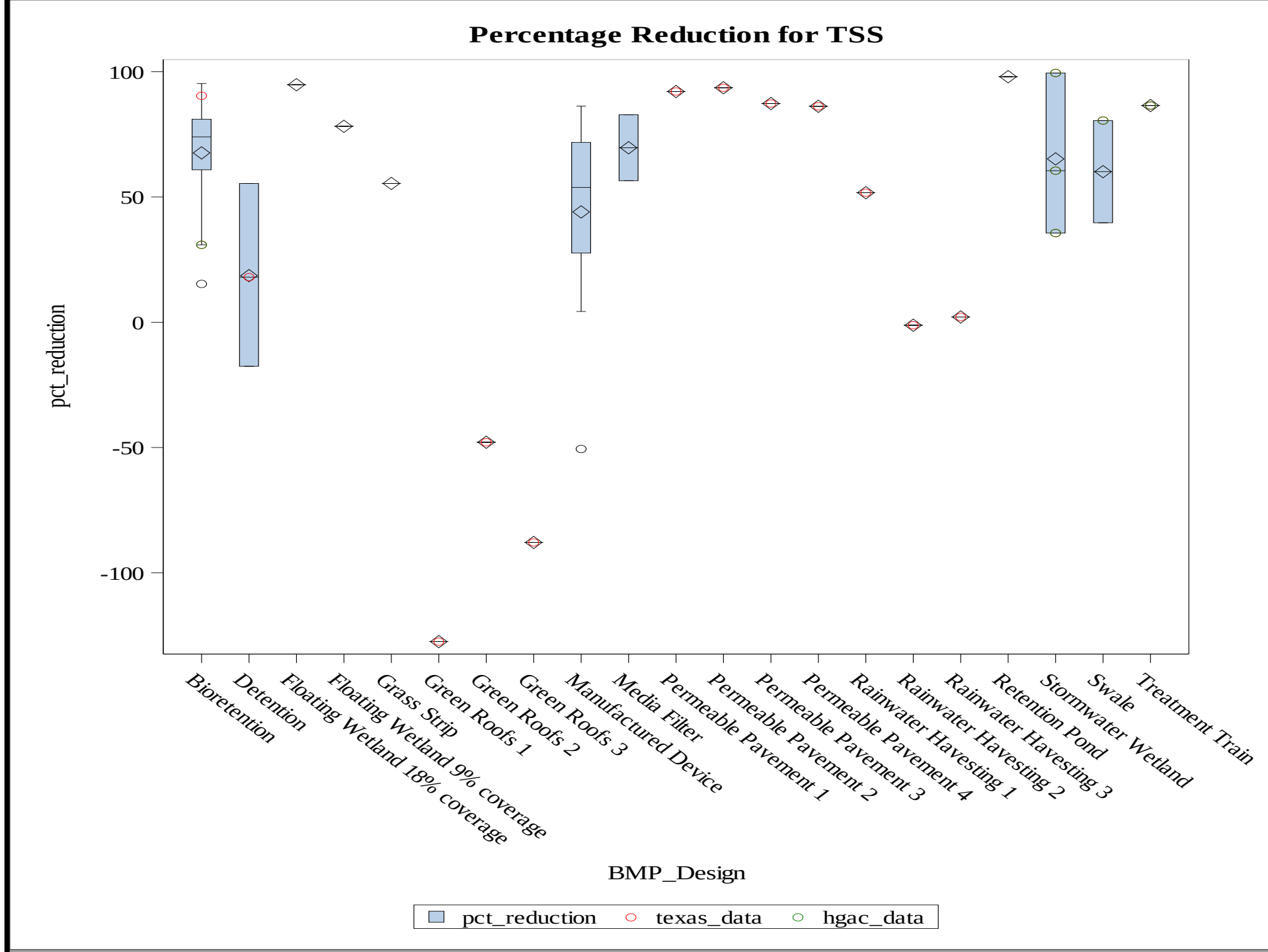
H-GAC Database and Analysis

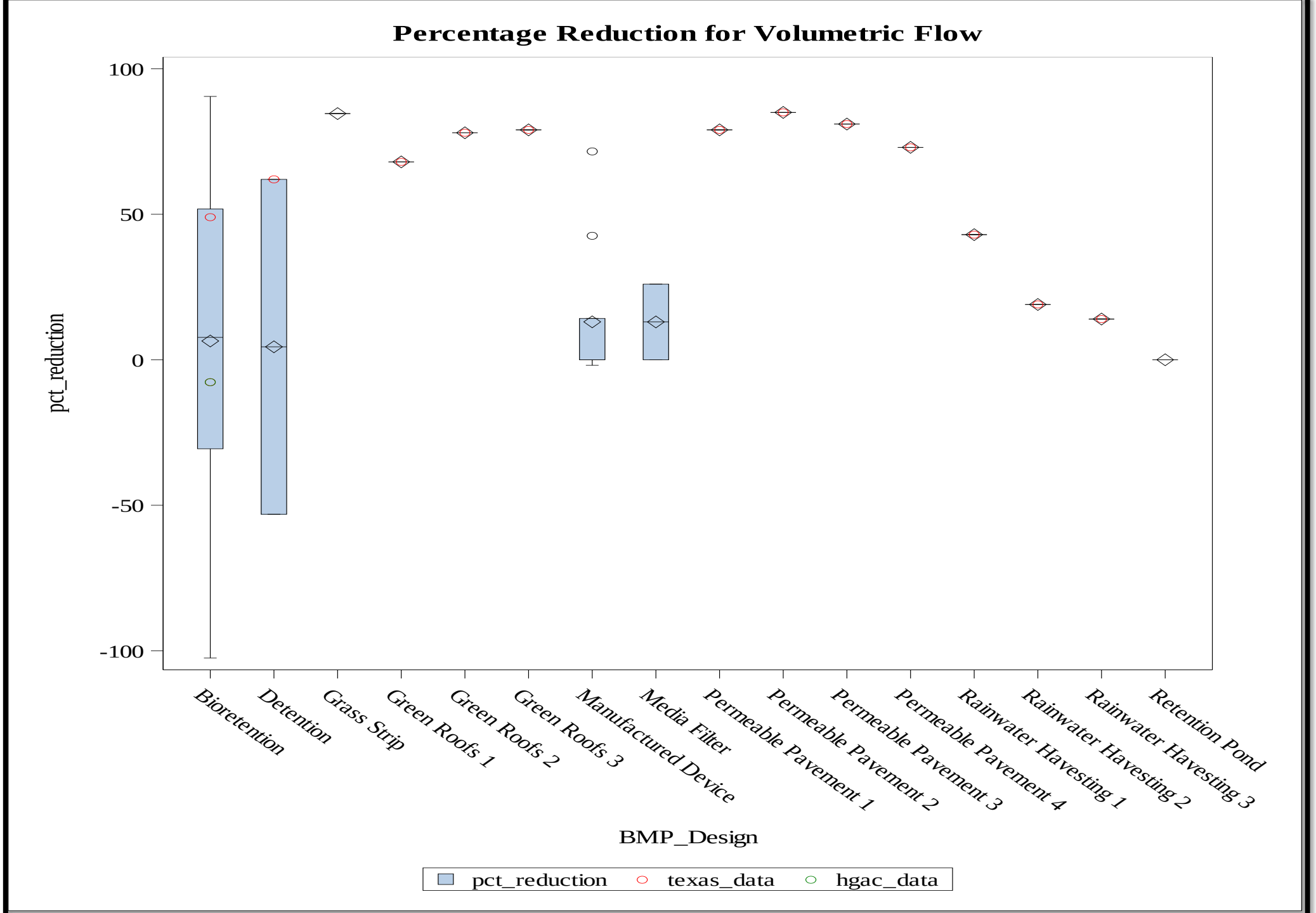
BMP_Design	SiteName	Lat	Long	AvgTKN_in	No_of_in	AvgTKN_out	No_of_out	DateSample	DateSample	pct_reduction
Bioretention	87th Metcalf BMP	38.9720	-94.6761	4.8181818	22	2.695	20	09/12/2008	09/15/2010	44.1
Bioretention	BRC Site A	35.9705	-77.9340	0.7581667	18	0.5398421	19	04/12/2008	03/01/2009	28.8
Bioretention	Birnamwood Dr.	30.0715	-95.3827	0.4597	1	0.3767	1	06/01/2014	02/01/2017	18.1
Bioretention	Cub Run Rec Center	38.8893	-77.4670	4.8866125	16	0.935	10	09/25/2008	03/28/2010	80.9
Bioretention	Greensboro bioretention-G1	36.1536	-79.8716	2.6147368	19	4.5	15	07/01/2003	09/27/2004	-72.1
Bioretention	Greensboro bioretention-G2	36.1536	-79.8716	1.3125	16	11.275	4	07/01/2003	09/27/2004	-759
Bioretention	I-95 Plaza Bioretention Cell	39.6629	-75.6903	5.719	10	2.7990909	11	04/01/2005	11/15/2007	51.1
Bioretention	Louisburg bioretention-L1	36.1326	-78.2221	1.4825	12	1.0558333	12	05/30/2004	12/23/2004	28.8
Bioretention	Louisburg bioretention-L2	36.1336	-78.2221	1.66	12	1	13	05/30/2004	12/23/2004	39.8
Bioretention	Mango Creek	35.7843	-78.5134	0.5427667	30	0.6646	30	11/02/2009	12/02/2010	-22.4
Bioretention	OP Recycling Center	38.9116	-94.6798	11.832759	29	2.4925926	27	07/16/2010	09/19/2013	78.9
Bioretention	SJC - Bio Ret 3B	39.0243	-94.7817	1.2365385	26	2.2590909	22	05/24/2012	09/28/2013	-82.7
Bioretention	SJC - Bio Ret 6	39.0233	-94.7810	1.0409091	33	1.292	25	05/24/2012	09/28/2013	-24.1
Detention	EIH UHCL Wetland	29.5825	-95.1016	2.23	1	3.23	1	04/01/2012	05/01/2012	-44.8
Detention	Floating Wetland Retrofit North Carolina	36.0271	-78.9002	1.155	2	0.66	2	11/01/2008	03/01/2010	42.9
Detention	SJC - Ext Dry	39.0228	-94.7818	1.1333333	3	1.6333333	6	07/07/2011	04/23/2013	-44.1
Floating Wetland 18% coverage	Floating Wetland Retrofit North Carolina	36.0271	-78.9002	3.32	1	0.37	1	07/01/2010	09/01/2011	88.9
Floating Wetland 9% coverage	Floating Wetland Retrofit North Carolina	36.0247	-78.9442	0.84	1	0.55	1	07/01/2010	09/01/2011	34.5
Grass Strip	Westfield Level Spreader	35.1811	-80.8488	128.37105	19	0.96	3	11/29/2005	01/05/2007	99.3
Manufactured Device	HC	39.6629	-75.6903	1.825	4	1.95	4	03/29/2007	06/30/2007	-6.8
Manufactured Device	I-95 Plaza AbTech Ultra-Urban Filter w/ Smart Sponge Plus Antimicrobial Additive	39.6629	-75.6903	5.5618182	11	2.539	10	12/13/2006	04/20/2009	54.3
Manufactured Device	I-95 Plaza AbTech Ultra-Urban Filter w/Smart Sponge	39.6629	-75.6903	11.179091	11	9.86	11	12/13/2006	04/20/2009	11.8
Manufactured Device	I-95 Plaza BaySaver	39.6629	-75.6903	10.622	10	7.497	10	11/16/2005	11/13/2008	29.4
Manufactured Device	I-95 Plaza HydroKleen Filter	39.6629	-75.6903	11.056	10	11.424	10	04/08/2006	04/28/2008	-3.3
Manufactured Device	I-95 Plaza StormFilter	39.6629	-75.6903	7.5790909	11	7.1581818	11	04/01/2005	11/15/2007	5.6


Percentage Reduction for TKN
100
50
0
-50
pct_reduction
Bioretention
Detention
Floating Wetland 18% coverage
Floating Wetland 9% coverage
Grass Strip
Manufactured Device
Media Filter
Stormwater Wetland Primary
Stormwater Wetland Secondary
Swale
Treatment Train
BMP_Design
pct_reduction
texas_data
hgac_data


Percentage Reduction for Ecoli
100
50
0
-50
pct_reduction
Bioretention
Detention
Grass Strip
Manufactured Device
Permeable Pavement 1
Permeable Pavement 2
Permeable Pavement 3
Permeable Pavement 4
Retention Pond
Stormwater Wetland
Swale
Treatment Train
Wetlands
BMP_Design
pct_reduction
texas_data
hgac_data


Percentage Reduction for Total Phosphate
100
50
0
-50
pct_reduction
Bioretention
Detention
Grass Strip
Manufactured Device
Media Filter
Retention Pond
Swale
BMP_Design
pct_reduction


Percentage Reduction for TSS
pct_reduction
100
50
0
-50
-100
Bioretention
Detention
Floating Wetland 18% coverage
Floating Wetland 9% coverage
Grass Strip
Green Roofs 1
Green Roofs 2
Green Roofs 3
Manufactured Device
Media Filter
Permeable Pavement 1
Permeable Pavement 2
Permeable Pavement 3
Rainwater Havesting 1
Rainwater Havesting 2
Rainwater Havesting 3
Retention Pond
Stormwater Wetland
Swale
Treatment Train
BMP_Design
pct_reduction
texas_data
hgac_data


Percentage Reduction for Volumetric Flow
100
50
0
-50
-100
pct_reduction
Bioretention
Detention
Grass Strip
Green Roofs 1
Green Roofs 2
Green Roofs 3
Manufactured Device
Media Filter
Permeable Pavement 1
Permeable Pavement 2
Permeable Pavement 3
Permeable Pavement 4
Rainwater Havesting 1
Rainwater Havesting 2
Rainwater Havesting 3
Retention Pond
BMP_Design
pct_reduction
texas_data
hgac_data

Considerations and Take-aways

1. Not a panacea
2. Local data like out-of-region
3. Design most important
4. Need more data
5. Efficacy
6. What’s next

Breakout Session

- Open Conversation
- If you need topics to start:
  - Your organization's experience with GI?
  - What is your perception of GI?
  - What is needed to expand GI?
  - Interested in continuing the conversation?

Acknowledgements

Galveston Bay Estuary Program

GALVESTON BAY ESTUARY PROGRAM

A PROGRAM OF THE TCEQ

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  - 832.681.2565
  - Megha.Shrestha@h-gac.com

Breakout Session

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