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GIFT Mid-scale Projects: Stormwater Wetlands and Conservation Neighborhood Planning

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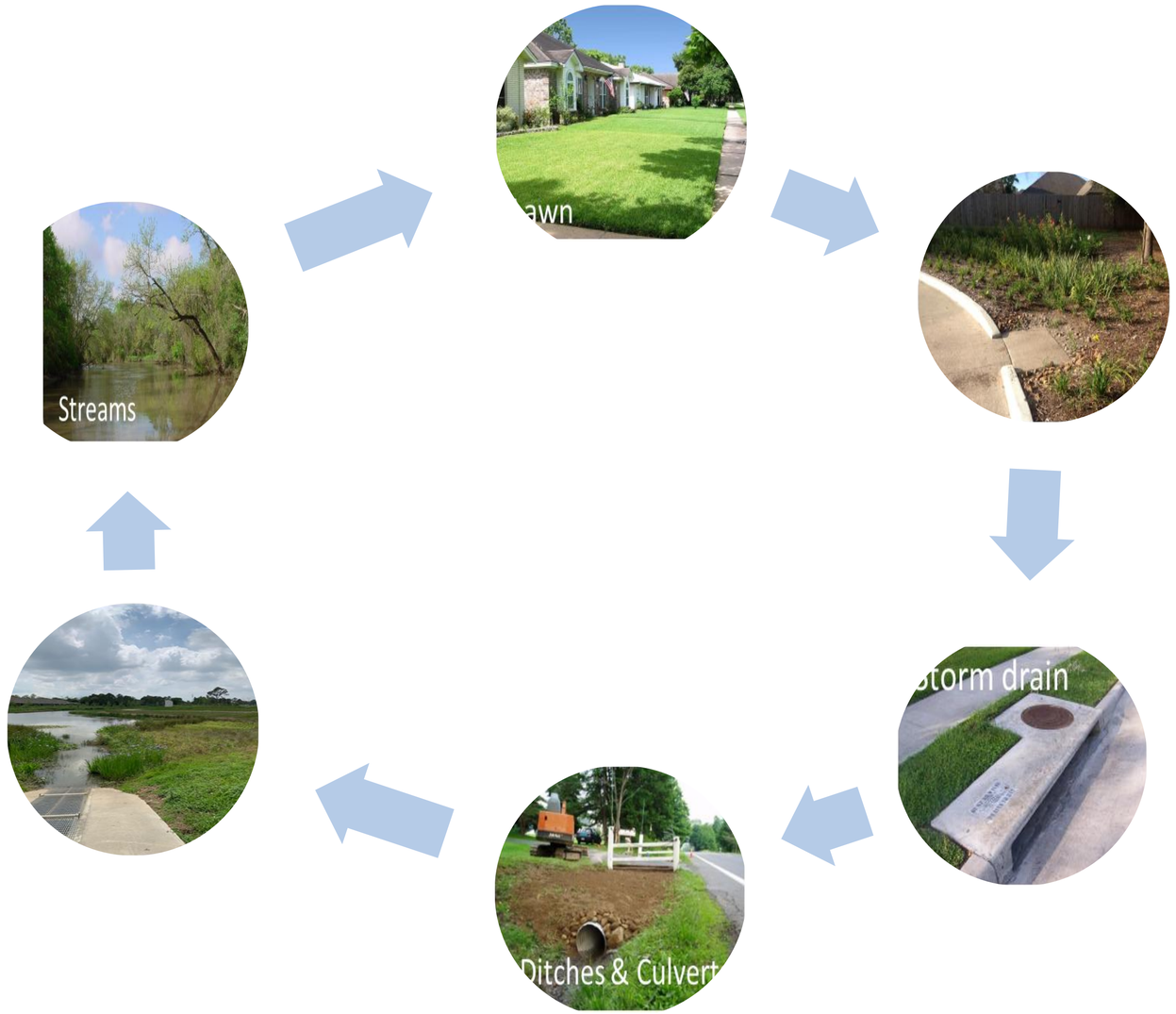
The Path of Runoff and Pollution



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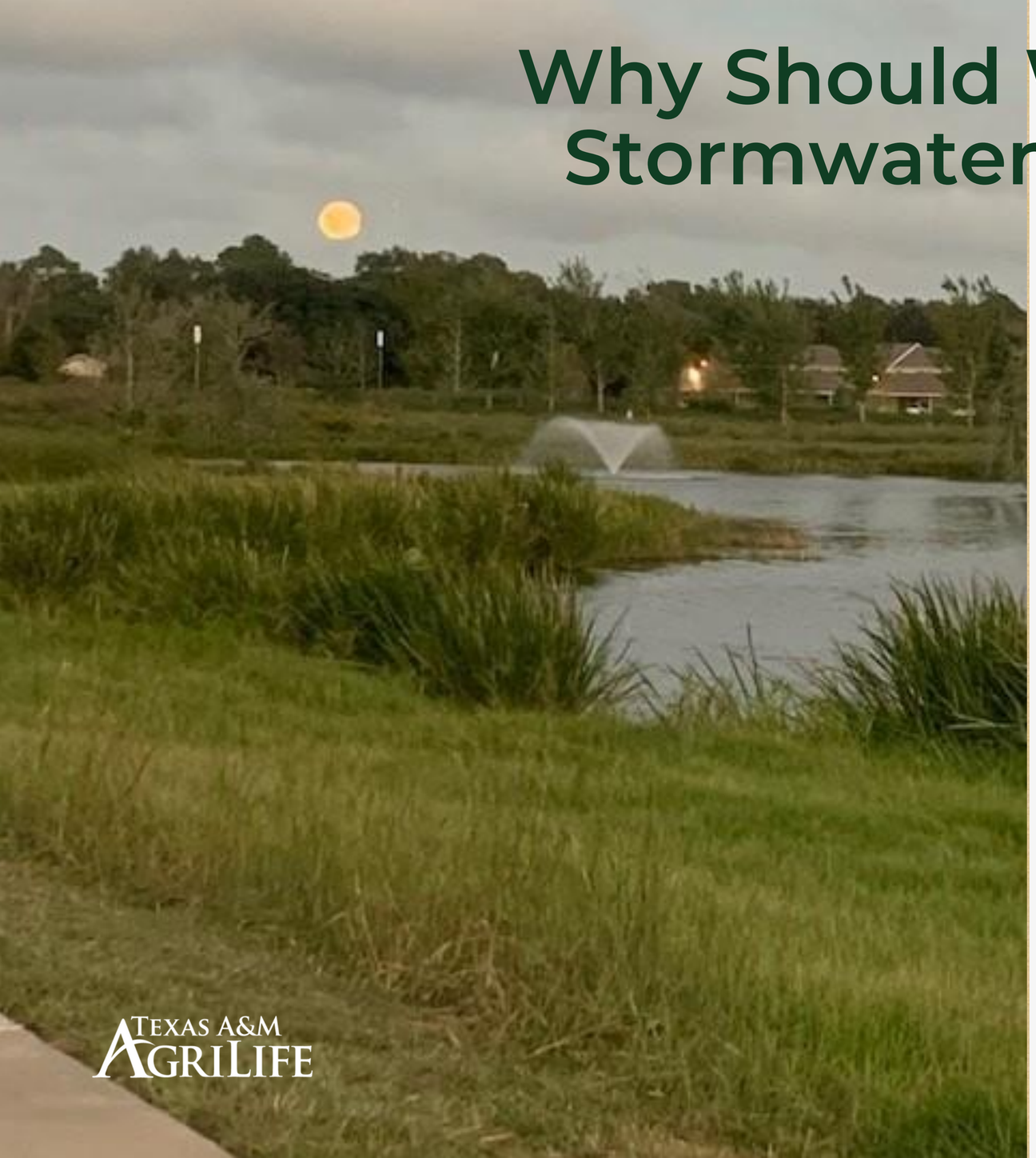

Why Should We Consider Stormwater Wetlands?

- Flood Control
- Water Quality
- Recreational & Health Benefits
- Wildlife Benefits
- Economic Benefits

Benefits to Wildlife

- Habitat Creation
- Nesting sites
- Food and water source
- Increase in Pollinators
- Biodiversity

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Benefits to People

- Flood Control
- Improved Water Quality
- Recreational & Health Benefits
- Educational Benefits
- Economic Benefits

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How Do We Receive These Benefits?

Planning

Research

Partnerships

What is a Stormwater Wetland?

Mason Park Stormwater Wetland on Brays Bayou

Construct for the purpose of flood control and water quality improvement

Not part of mitigation for permitted activity

Medium or Neighborhood scale stormwater detention area connected to larger waterbody

EPA: Maintaining only 15% of the area of a watershed in wetlands can reduce flooding peaks by 60%.

How do we begin?

Study
What is the issue? Where does the water come from and where does it flow? Surfaces, Soil, Size, Coverage Area

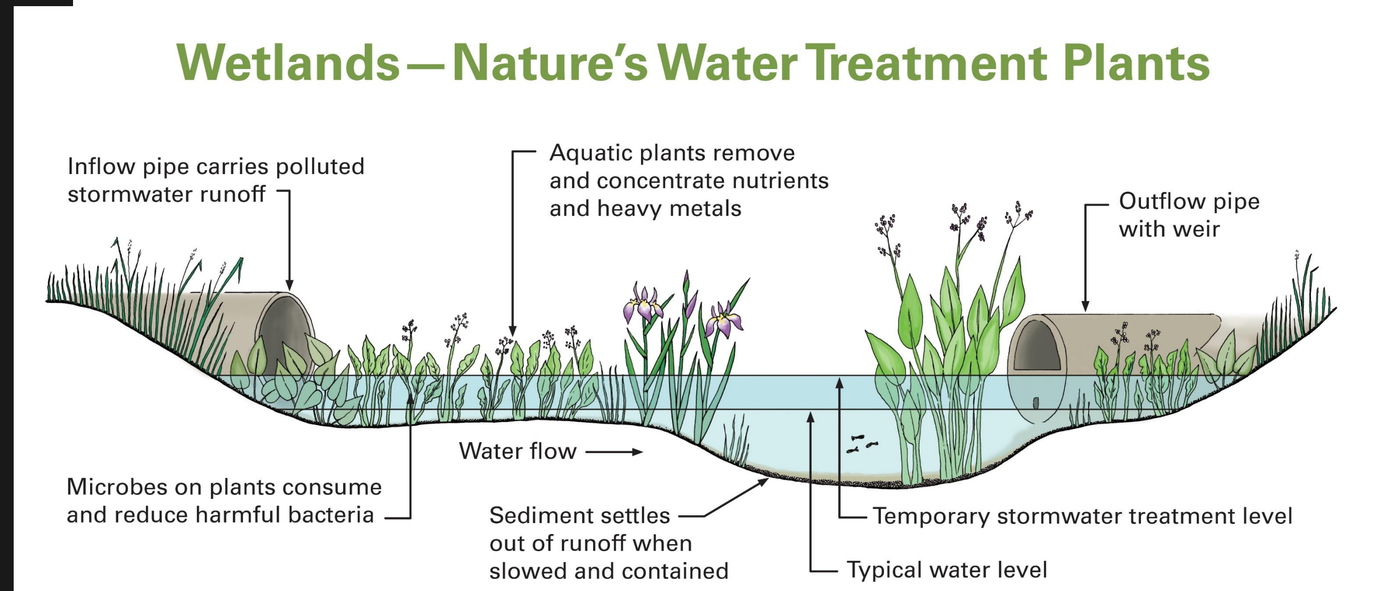
Design
What do we want? Outreach to community, depth, ratio of water to wetland, microtopography, planting type, cost evaluation, control structure, hold time

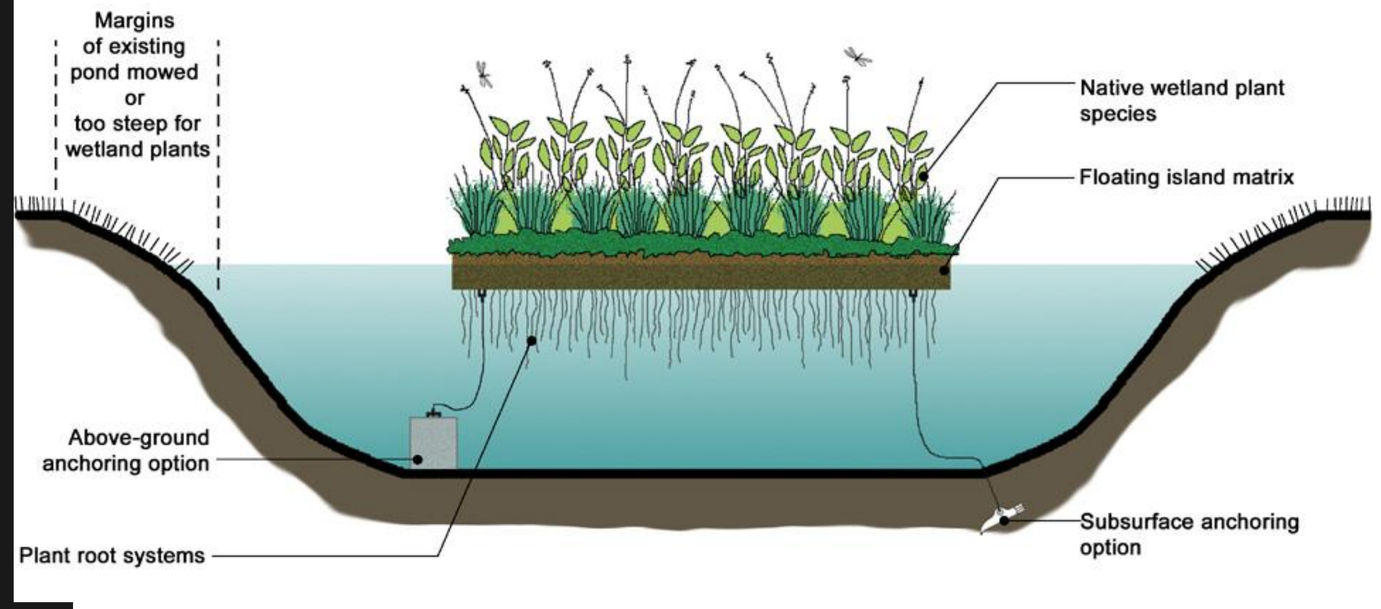
Construction
Excavation, Testing, Planting, Seeding

Maintenance and Monitoring
It takes time for the plants to fully establish (1-3 years), will need to remove sediment occasionally, mowing schedule, what to do about nuisance animals or undesirable plants.

Communication is the key.

Two Basic styles of Stormwater Wetlands





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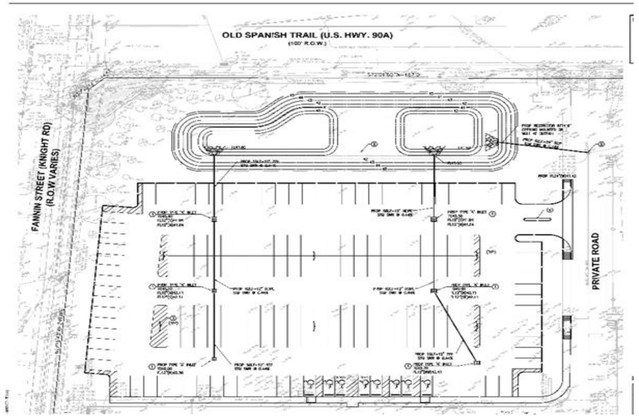
Sample Demonstration Projects

City: Houston
Watershed: Brays Bayou
Size: 0.25 ac



City: Houston
Watershed: Brays Bayou
Size: 0.62 ac

Mix of Green in between Grey Infrastructure can still create benefits.

Sample Demonstration Projects

Floating Wetland Retrofit at Pearland Nature Center

City: Pearland
Watershed: Clear Creek
Size (pond): 26 acres

Floating Wetland UTMB League City Campus Detention Basin Retrofit

City: League City
Watershed: Dickinson Bayou
Size (wetland): 25 sq. ft.

Houston Botanic Garden

City: Houston
Watershed: Sims Bayou
Size: ~ 3 Acres

Sample Demonstration Projects

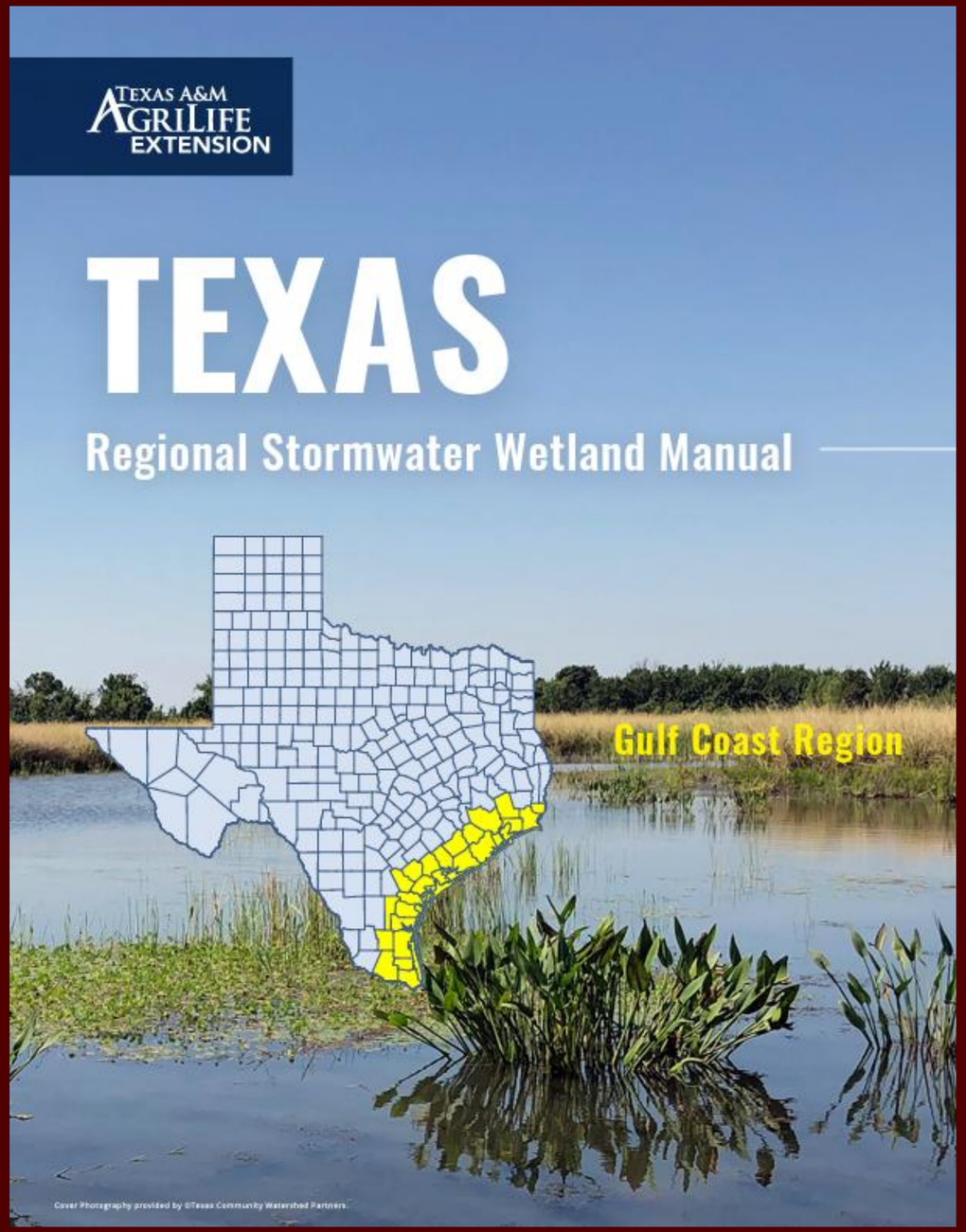
City: Houston (Clear Lake City)
Watershed: Clear Creek
Size at completion: 40 acres wetland within 200 acres parkland
Project Partners:

- **Exploration Green Conservancy**
- **Clear Lake City Water Authority**
- **Texas Master Naturalist Program**
- **Galveston Bay Foundation**
- **Texas Parks and Wildlife**
- **Galveston Bay Estuary Program TCEQ**
- **Coastal Management Program GLO**
- **NOAA**
- **County Commissioner's Office**

Project Nursery

Can’t remember all the things we discussed today?

Pick up a copy of the stormwater wetland resource on our publication table.



Parameters Monitored at Exploration Green

Bi-Weekly Lab Data

- AMMONIA-N (mg/L)
- TOTAL SUSPENDED SOLIDS (TSS) (mg/L)
- TOTAL PHOSPHORUS (mg/L)
- E. COLI (mpn/100mL)

Weekly Field Data

- DISSOLVED OXYGEN (DO) (mg/L)
- WATER TEMPERATURE (°C)
- SPECIFIC CONDUCTANCE (µs/cm)
- AMMONIUM-N (mg/L)
- pH

Passive collection

- FLOW LEVEL (ft.)
- RAINFALL AMOUNT (in.)

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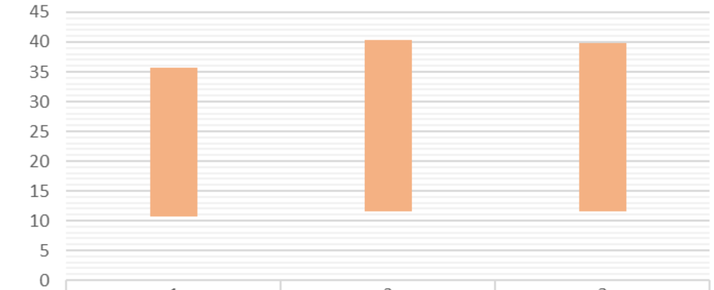
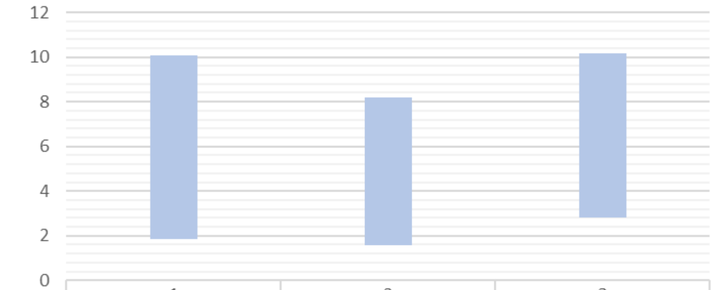
°C Range



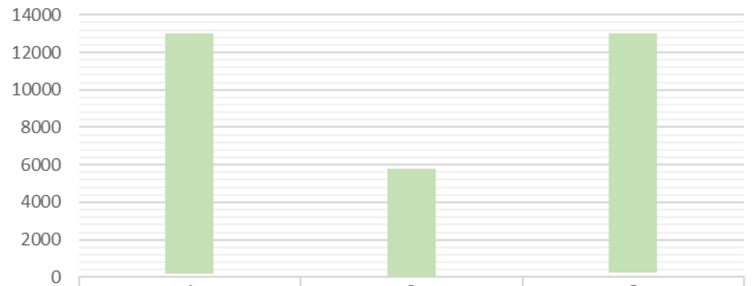
	1	2	3
Max	35.6	40.3	39.8
Min	10.7	11.5	11.6

DO Range



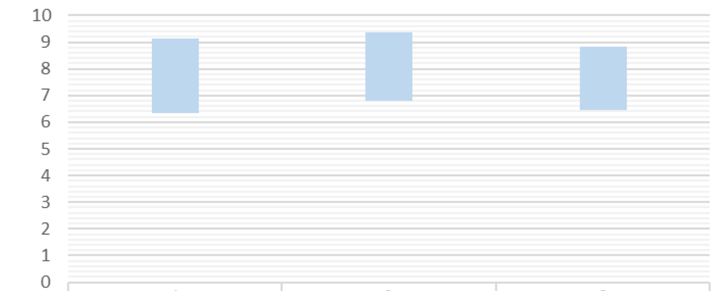
	1	2	3
Max	10.09	8.21	10.19
Min	1.85	1.57	2.8

E. Coli Range



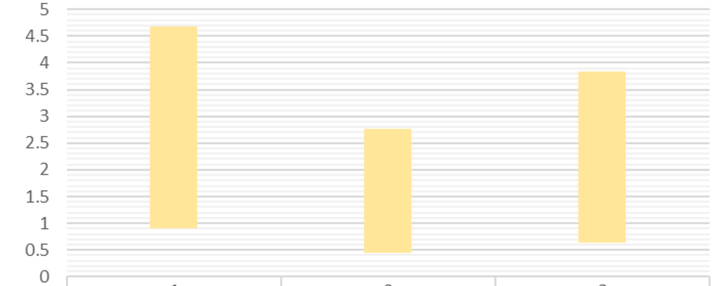
	1	2	3
Max	13000	5790	13000
Min	172	10	228

pH Range



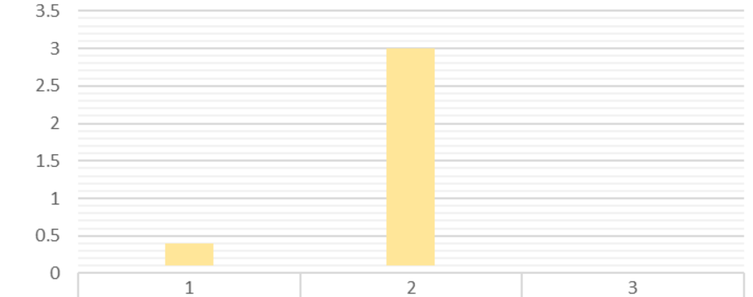
	1	2	3
Max	9.15	9.36	8.81
Min	6.34	6.8	6.45

Ammonium-N Range



	1	2	3
Max	4.67	2.76	3.84
Min	0.91	0.44	0.64

Ammonia-N Range

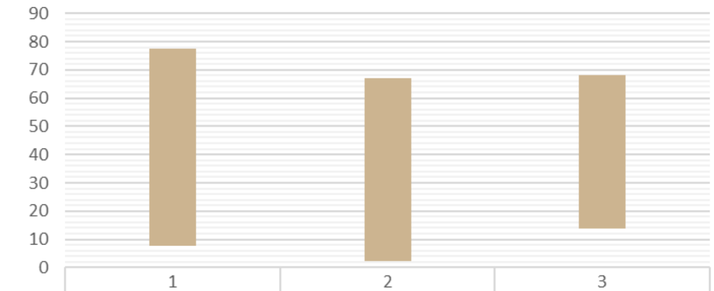


	1	2	3
Max	0.4	3	0.1
Min	0.1	0.1	0.1

Specific Conductivity Range

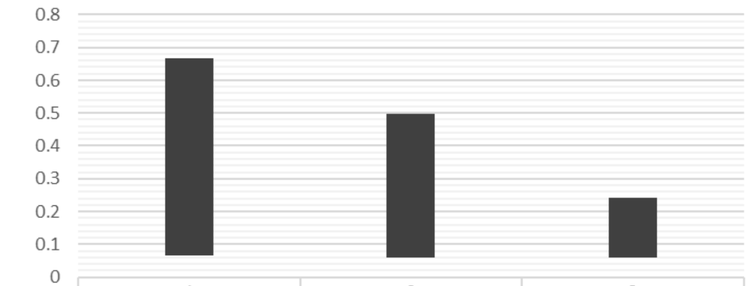
	1	2	3
Max	721	608	648
Min	222.9	188.3	322.1

TSS Range

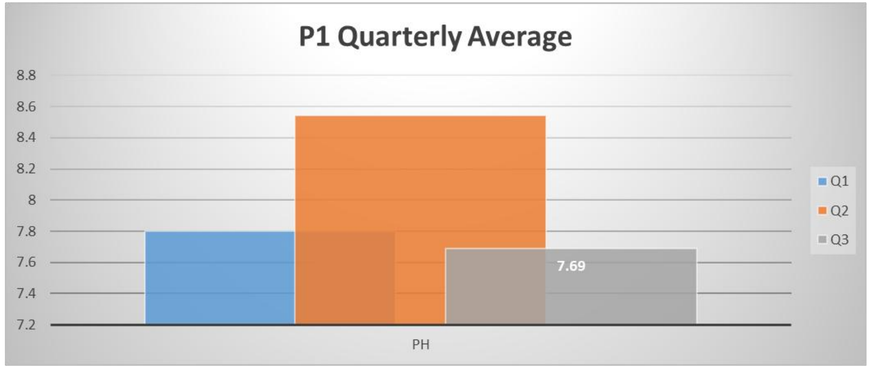


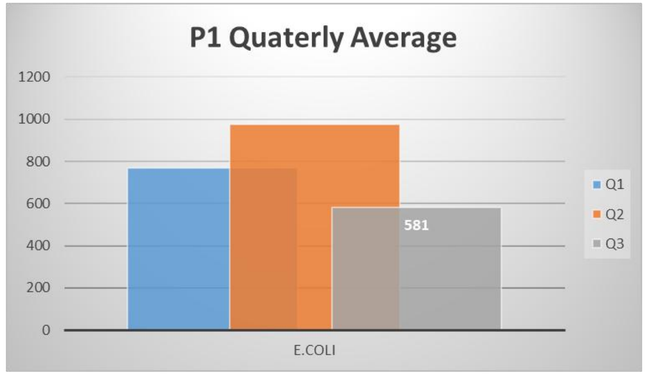
	1	2	3
Max	77.5	67.1	68.2
Min	7.6	2.2	13.7

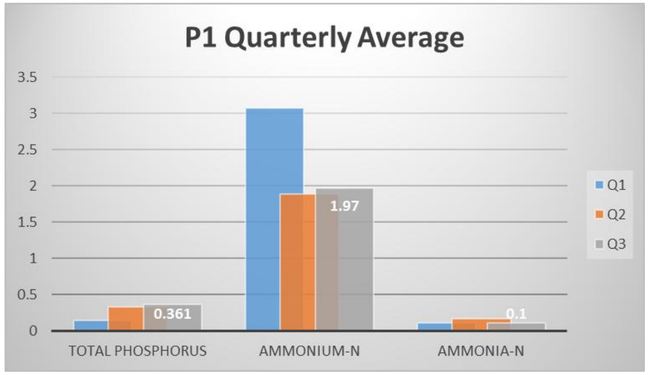
Total Phosphorus Range

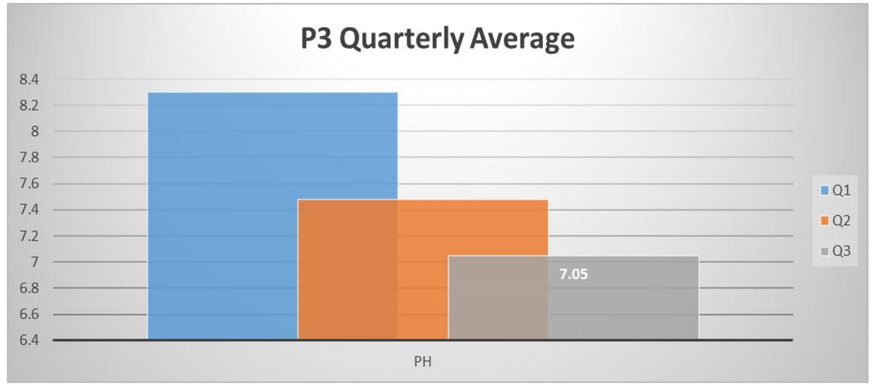


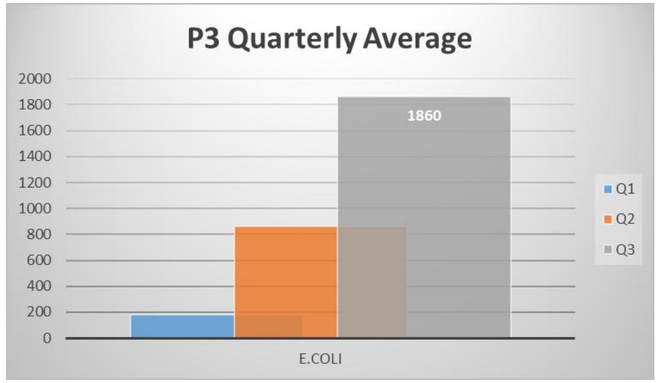
	1	2	3
Max	0.668	0.496	0.242
Min	0.0665	0.06	0.06

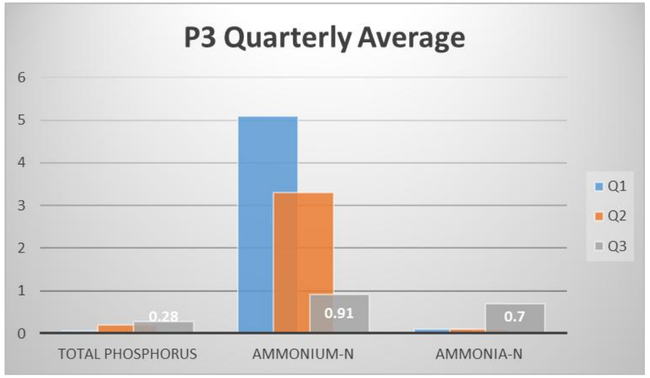

P1 Quarterly Average
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
7.69
PH
Q1
Q2
Q3

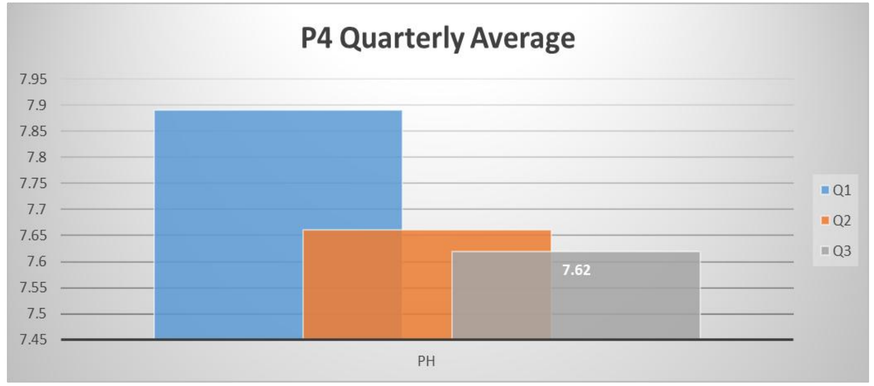

P1 Quaterly Average
1200
1000
800
600
400
200
0
581
E.COLI
Q1
Q2
Q3

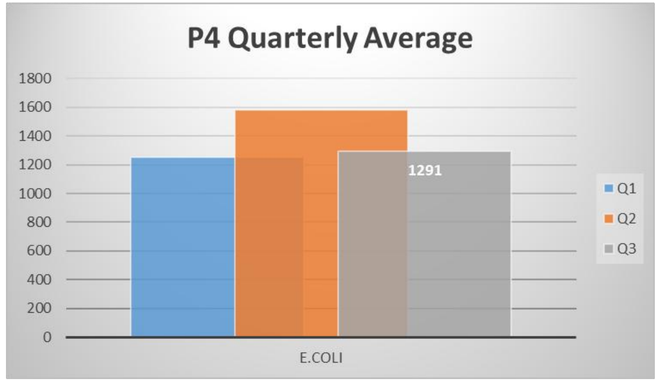

P1 Quarterly Average
3.5
3
2.5
2
1.5
1
0.5
0
0.361
1.97
0.1
TOTAL PHOSPHORUS
AMMONIUM-N
AMMONIA-N
Q1
Q2
Q3

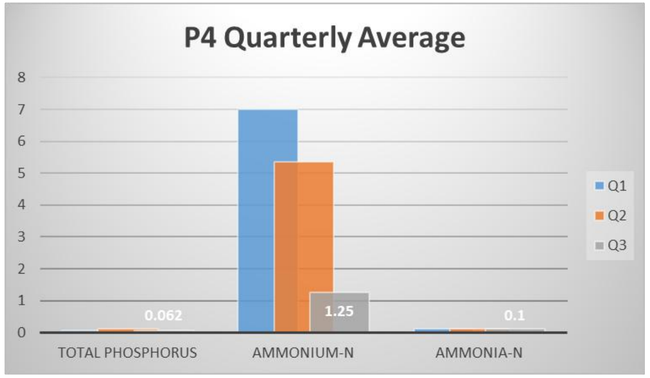

P3 Quarterly Average
8.4
8.2
8
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
7.05
PH
Q1
Q2
Q3


P3 Quarterly Average
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1860
E.COLI
Q1
Q2
Q3


P3 Quarterly Average
6
5
4
3
2
1
0
0.28
0.91
0.7
TOTAL PHOSPHORUS
AMMONIUM-N
AMMONIA-N
Q1
Q2
Q3


P4 Quarterly Average
7.95
7.9
7.85
7.8
7.75
7.7
7.65
7.6
7.55
7.5
7.45
7.62
PH
Q1
Q2
Q3


P4 Quarterly Average
1800
1600
1400
1200
1000
800
600
400
200
0
1291
E.COLI
Q1
Q2
Q3


P4 Quarterly Average
8
7
6
5
4
3
2
1
0
0.062
1.25
0.1
TOTAL PHOSPHORUS
AMMONIUM-N
AMMONIA-N
Q1
Q2
Q3

Check out our website

https://tcwp.tamu.edu/stormwater/wetlands/stormwater-wetland-water-quality-monitoring-project/

Quarterly Water quality updates

Lab reports

Data Tables

QAPP

Archive

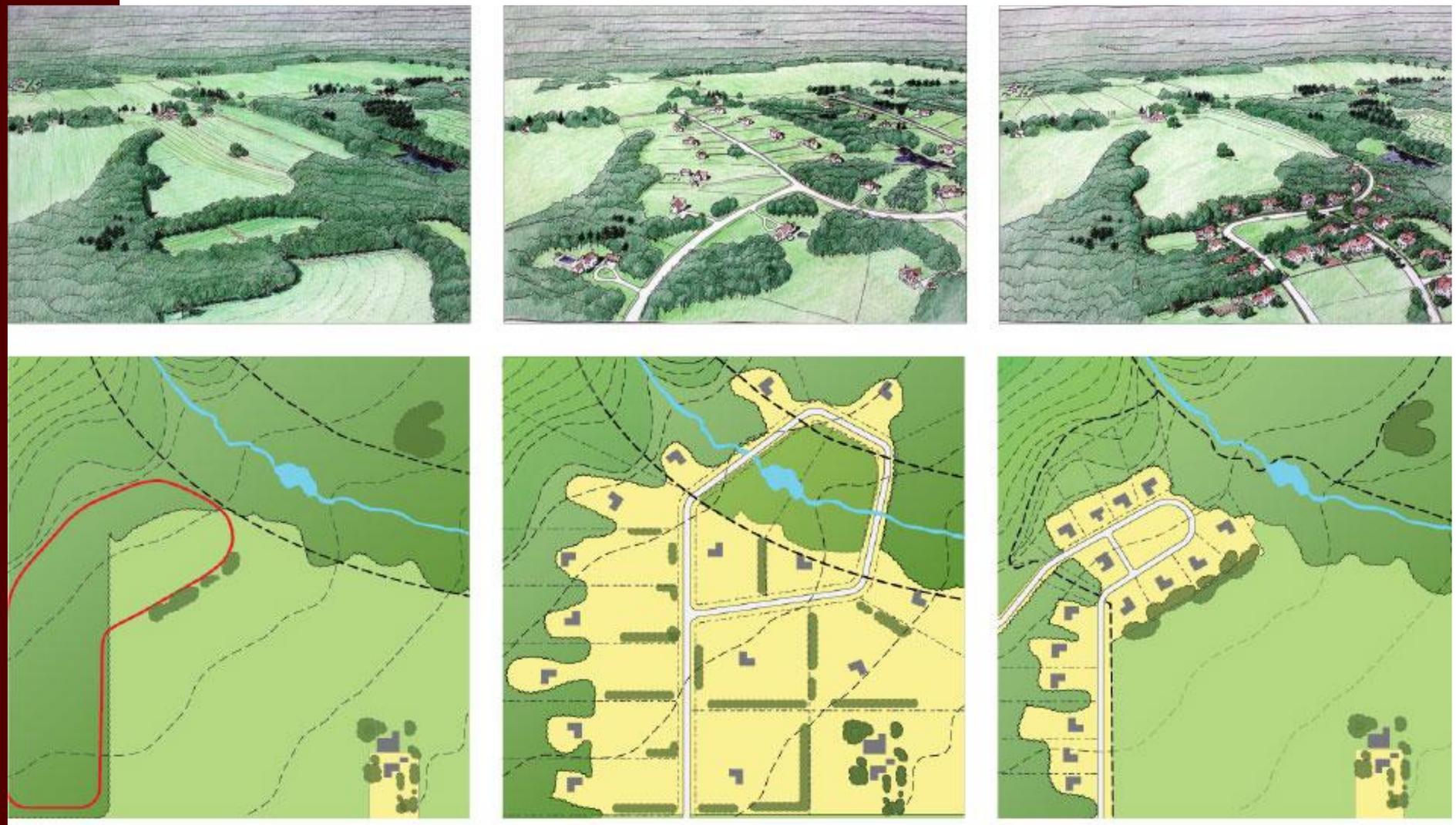
Charts & Graphs provided by Kimberly Walls

What if wetlands aren’t right for an area?

A **conservation development** is usually defined as a project that dedicates a minimum of 50 percent of the total development parcel as open space.

Not one size fits all…

Conservation development refers to an approach that combines new residential construction and land protection and generates revenue while accomplishing conservation goals. Although often discussed in terms of clustered, high-density housing – as opposed to sprawl – conservation development can include many other types of projects, depending on their particular conservation goals and outcomes.



http://www.designyourtown.org/design_detail/conservation-subdivisions/

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Empowering Texans to build resilient communities adaptable to social, economic, and environmental change.

Contact Us

We'd love to talk about **all things Wetlands and Watersheds.**

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