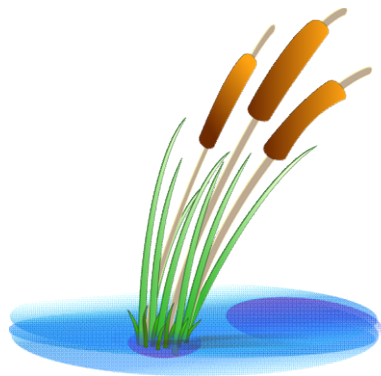


Challenges & Alternatives to Traditional Wetland Mitigation in an Urban Environment: The Charlotte Case Study

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Program History



Missions of Charlotte Storm Water Services:



Maintain storm water infrastructure



Reduce flooding



Improve water quality

Program History

Water Quality in Charlotte

- Phase 1 MS4 (NPDES)
- 401/404 permitting
- City Council Environmental Focus Area
 - “Charlotte will become global leader in environmental sustainability, balancing economic growth with preserving natural resources.”
- What is our #1 pollutant?
 - Sediment!

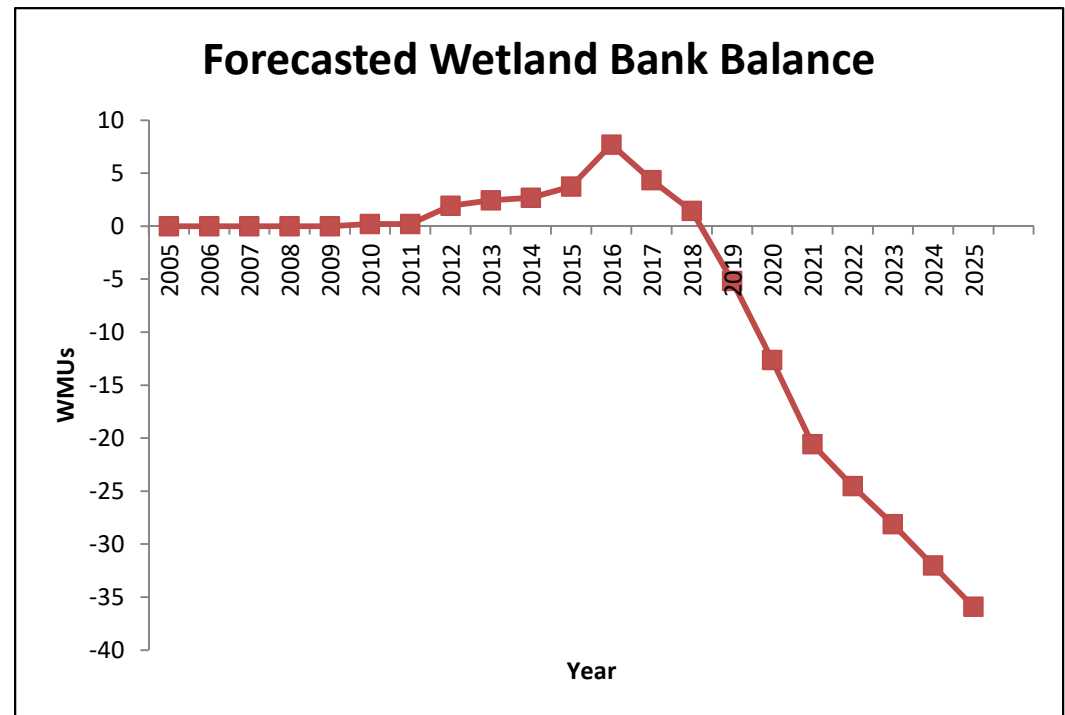


Program History



Mitigation Bank

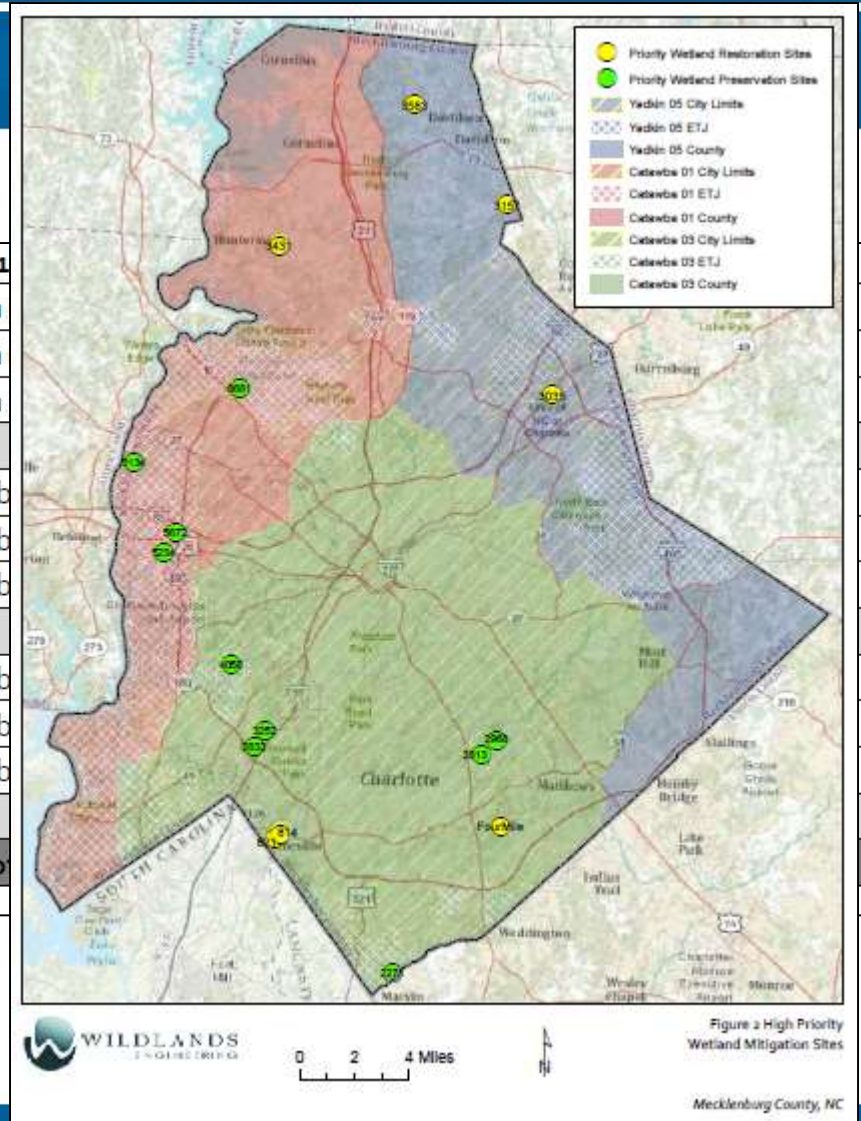
- City of Charlotte Umbrella Stream and Wetland Mitigation Bank est. 2004
 - Watershed improvement tool
 - Mitigation for municipal project impacts
 - Keeps mitigation local
- 3 service areas (Cat03, Cat01, Rocky/Yadkin)
- Currently contains 20 projects at various stages
- No standalone wetland projects



Wetland Site Search

- CSWS contracted with Wildlands Engineering to perform GIS identification and field verification of potential sites
 - Few viable opportunities
- CSWS performed additional ground-truthing and reduced site selection criteria
 - Still limited opportunities
- Other City projects
- Annual county stream walks

Table 1
Yadkin
Yadkin
Yadkin
Catawb
Catawb
Catawb
Catawb
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To



Unique Opportunity

- Mecklenburg County Park and Recreation nature preserves
 - Looking to decrease maintenance
 - Looking to create more natural/native communities
- Presented several options, CSWS investigated in field

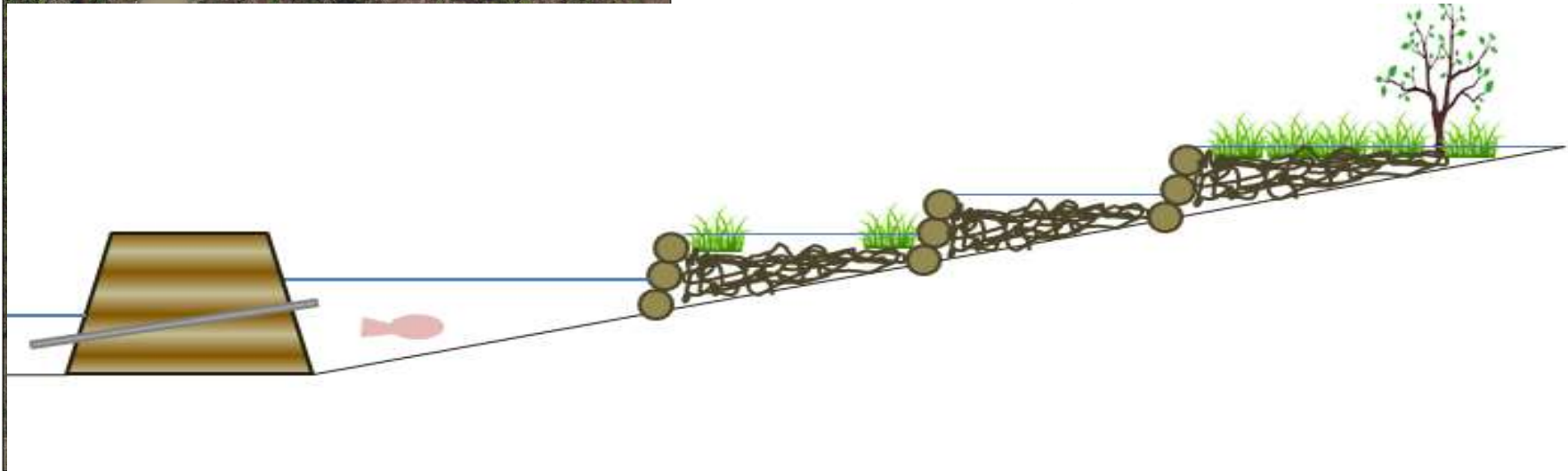


Ribbonwalk Nature Preserve

Ribbonwalk Preliminary Existing Conditions Map

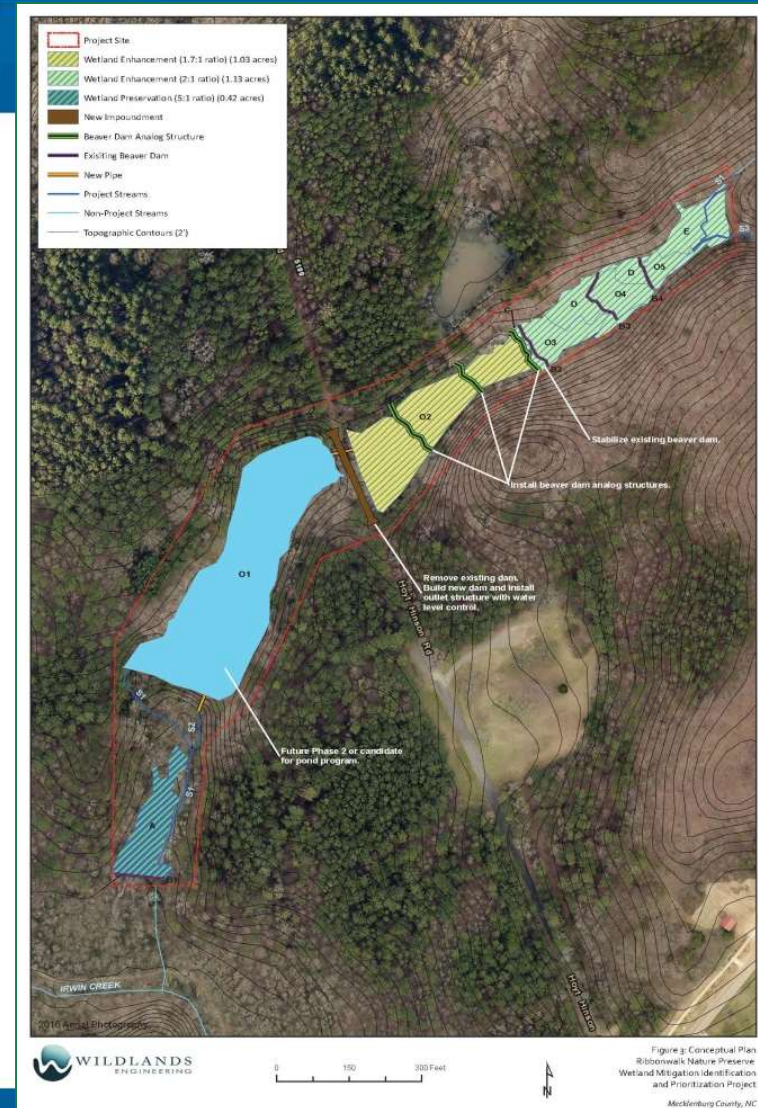


- 2 in line ponds separated by a dam and gravel trail
- Upper pond fed by 2 tribs
- Outlet clogged/failing at Upper pond
- Lower pond spillway breached; held in place by beaver dam



Concept Plan

- Use existing wetlands as a reference condition
- Combination preservation, enhancement, and reestablishment
- Terraced beaver dam wetland system using reinforced BDAs
- Adaptive management plan



Project Objectives

- Beyond obtaining needed mitigation credits, CSWS aims to advance the science of wetland restoration in urban areas.
- Does converting open water to wetlands provide significant functional uplift?
 - What types of uplift?
 - To what degree?

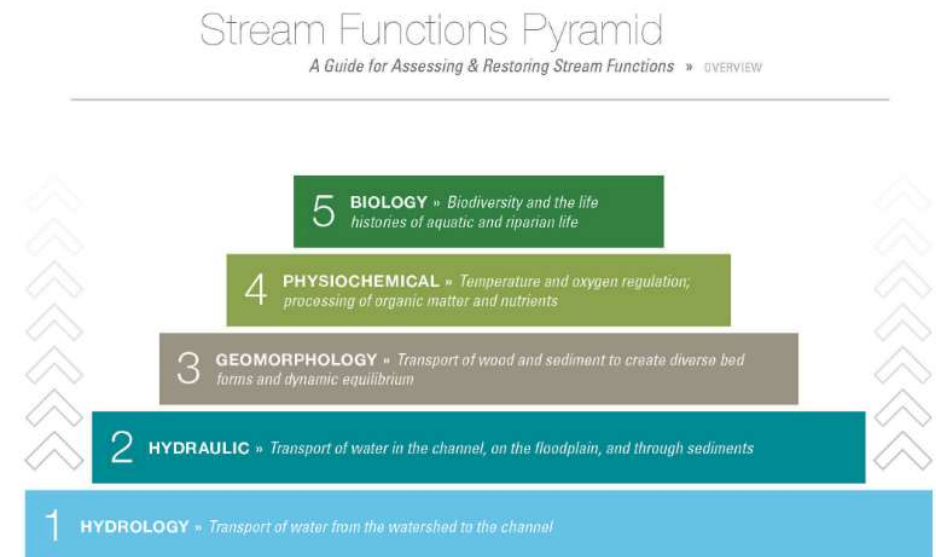


FIGURE 1

Project Goals



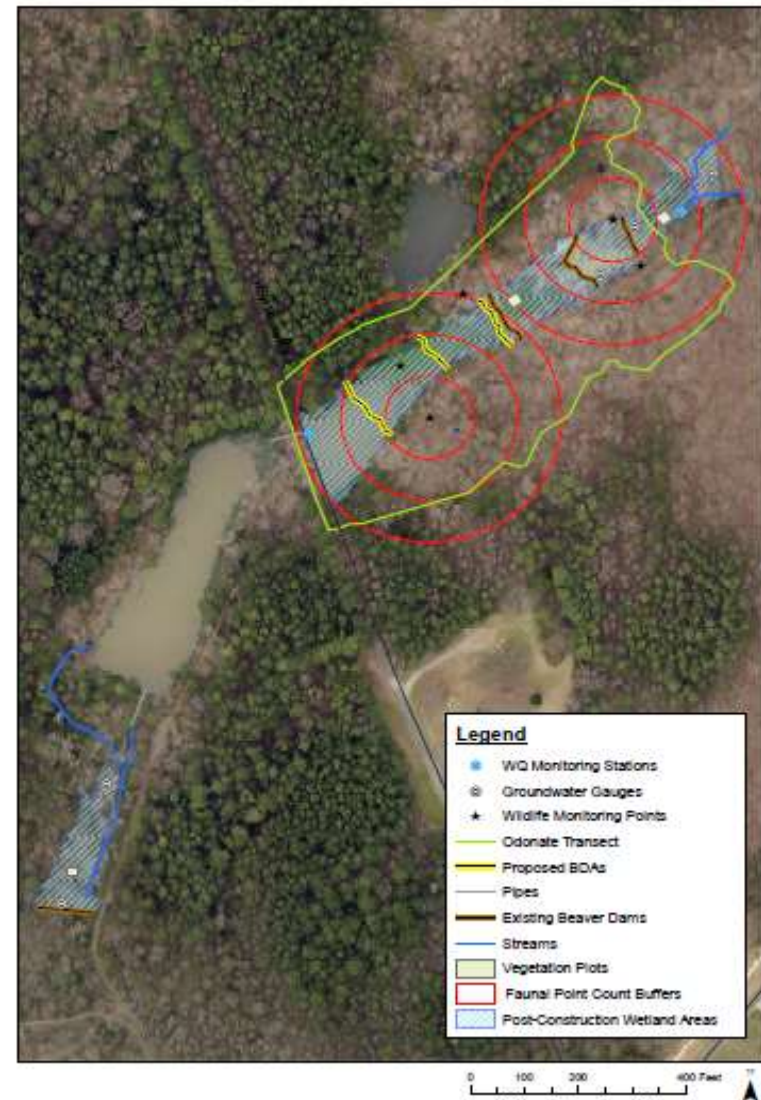
- Improve habitat: Enhance and preserve rare natural communities in an urban setting.
- Improve water quality: Increase nutrient uptake.
- Improve vegetative community: increase extent of non-tidal freshwater marsh vegetation.
- Improve biological diversity: Increase diversity and abundance of species associated with target community (non-tidal freshwater marsh).



Monitoring Plan

- Traditional mitigation vs. functional lift monitoring
- Pre- vs. Post
- Monitoring partnerships
 - Park and Rec
 - County Storm Water
 - Private consultant

Ribbonwalk Preliminary Pre-Construction Monitoring Map



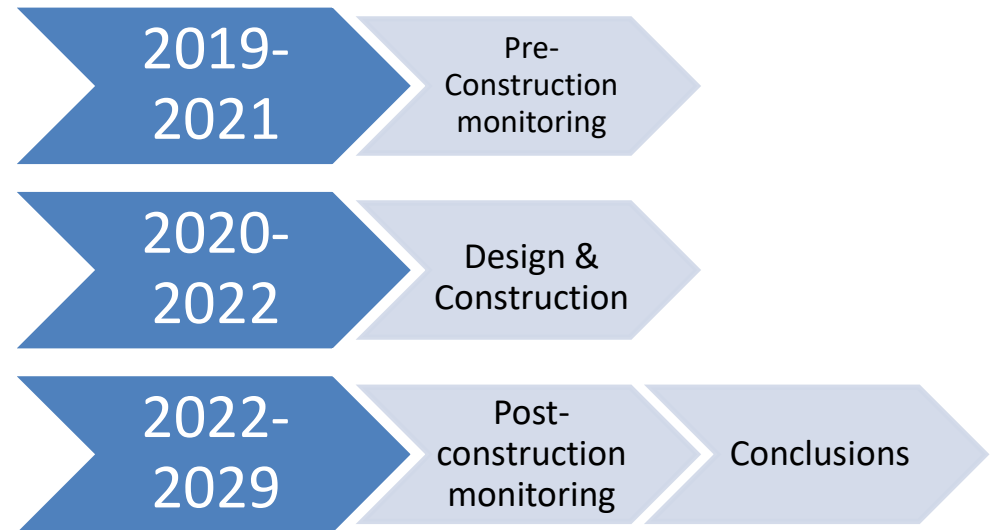
Monitoring Plan



- Monitoring components

- Vegetation
 - Standard plots and visual assessment
- Hydrology
 - Groundwater gauges
- Fauna
 - Plot watchers
 - Bat surveys
 - Salamanders
 - Dip netting
 - General visual/audible encounters
 - Fish?
- WQ
 - Bi-monthly grab sampling
 - TSS, temp, pH, conductivity
 - Nutrients, metals

- Timeline



Next Steps

- IRT feedback
 - Potential crediting scenarios
 - PSSMP preparation
- Pre-construction monitoring
 - Fall 2019- 2021
 - Refine SMART goals based on results
- Designing for maintenance
 - Wildlife management?
- Future of “alternative” mitigation





QUESTIONS?

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