

Seeding Benthic Macroinvertebrates by use of *Habitubes* as a Habitat Restoration Technique in Several Stream Sections in Greensboro, NC



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Presentation Overview

- Background of Project
- Overview of Site selection
- Use of *Habitubes* for instream habitat restoration
- Current macroinvertebrate data review
- Next phases of project implementation
- Summary/conclusion

**For the last 20 years ... why
has stream restoration not
worked more effectively
for aquatic biology?**

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**Stream restoration work has
historically focused on
channel structures and bank
stabilization.**

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What has been omitted?

- **Variable Types of Habitat**
- **Food for Organisms**
- **'Micro' Habitat**



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How Greensboro project got started



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Project Scope

- **Site selection (receiving & donor streams)**
- **Baseline benthos sample collection**
- **Placement of *HabiTubes***
- **Restocking with organic material (as needed)**
- **Pre-relocation benthos sample collection**
- **Relocation of *Habitubes*/Benthos (min of 3 times)**
- **Post benthos sample collection**
- **Data analysis and final summary report**

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Potential restoration projects for the *Habitube* System

- City had several projects that could serve as good candidates for the *Habitube* system.
- One site, People's Creek, was a stream restoration project completed by NC Division of Mitigation Services (formerly EEP)-2003.
- The second site, Kersey Tributary, was a City stream enhancement project built in collaboration with the NC Clean Water Management Trust Fund-2013.

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People's Creek



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Kersey Tributary



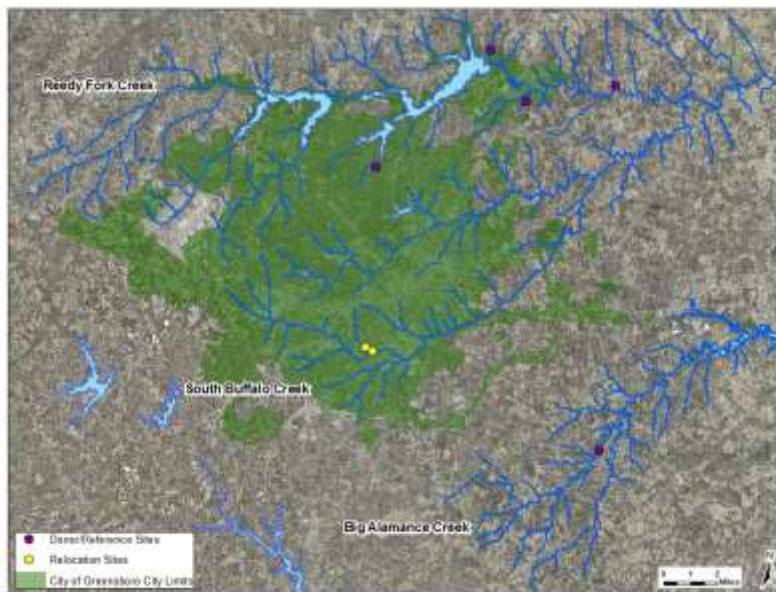
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Donor Streams to the Rescue!!!...

- **Big Alamance Creek, King Edwards Tributary, Reedy Fork Creek, Pawpaw Creek, and Tom's Creek.**
- **Donor streams are mainly located in the less developed northern part of City/Guilford County with the exception of Big Alamance Creek.**
- **Where more pollution intolerant benthos reside....**



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Why Use *HabiTubes*??

- A tool specific to aquatic habitat restoration.
- Can be filled with native leaves, sticks, wood, etc.
- Provides a food source for benthic macroinvertebrates.
- *HabiTubes* are reusable and refillable.
- Proprietary and Patented.

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Benefits Continued....

- Artificial and natural way to keep leaf packs and woody debris in place for extended time.
- A relatively easy way to move organisms from one stream to another.
- Can help speed up the recovery of macroinvertebrates after a stream restoration project and provide an ecological lift.
- Provides a place for organisms to hang on during high or flashy flows.
- Are very durable and can last 3 to 5 years.

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Installation Guidelines

- How to select donor streams.
- How to collect and label donor material.
- Installation site selection and date.
- Care and maintenance of the habitat.



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1st Relocation of *HabiTubes* from donor streams into Kersey and People's Creeks



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Seeding of donor *HabiTubes* in People's Creek



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Macroinvertebrate Surveys

- Samples collected using the standard qualitative method as outlined by the NC Department of Environmental Quality.
- 2 Kick net samples, 3 sweep-net samples, 1 leaf-pack, 2 fine-mesh rock and/or log wash, sand sample, and visual collection.
- Baseline samples of receiving & donor streams, relocation samples (sub group), and two final surveys after last relocation effort.

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Samples collected and analyzed by Dave Penrose



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1st Benthos Stream Assessment for Kersey & People's Creeks

Kersey & People's Creeks

	Kersey Ck.	People's Ck.
Total Taxa Richness	31	22
EPT Taxa Richness	6	4
EPT Abundance	19	40
Biotic Index	7.28	6.66
Number of taxa = 2.5 or less	1	0
Bioclassification*	Fair	Fair

*used full scale criteria despite the fact that these are very small streams.

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Benthos Stream Assessment for “Donor” Creeks

	<u>Alamance Ck.</u>	<u>Paw Paw Ck.</u>	<u>Reedy Fork Ck.</u>	<u>King Edwards Ct.</u>
Total Taxa Richness	58	37	44	39
EPT Taxa Richness	16	10	13	11
EPT Abundance	87	52	71	51
Biotic Index	5.88	5.54	5.88	5.6
Number of taxa = 2.5 or less	4	6	1	4
Bioclassification*	Good/Fair	Good/Fair	Good/Fair	Good/Fair

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Current & Next Steps...

- **Conducted partial relocation from three streams in September & December of 2015.**
- **Refilled HabiTubes in December, 2015.**
- **Conducted a relocation from three streams in early March, 2016.**
- **Scheduled for a major relocation in April, 2016.**
- **Analyze relocation samples (sub group).**
- **Two benthos surveys after last relocation effort.**

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Lessons learned and adapting to Environmental Challenges...

- **Need to factor in the unpredictable nature of weather**
 - Drought
 - Donor stream went dry
 - Low Water in restored/receiver streams
 - Strong El Nino (High Water) & Flashy Flows
 - Beavers
- **Have multiple donor stream locations & don't put all your eggs in one basket!!**

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Drought on Paw Paw Creek



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Questions???



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