



Bionomic Education Training Centers: A Strategic Plan Initiative

Michael Dupree

Durham County, NC



Durham County, NC

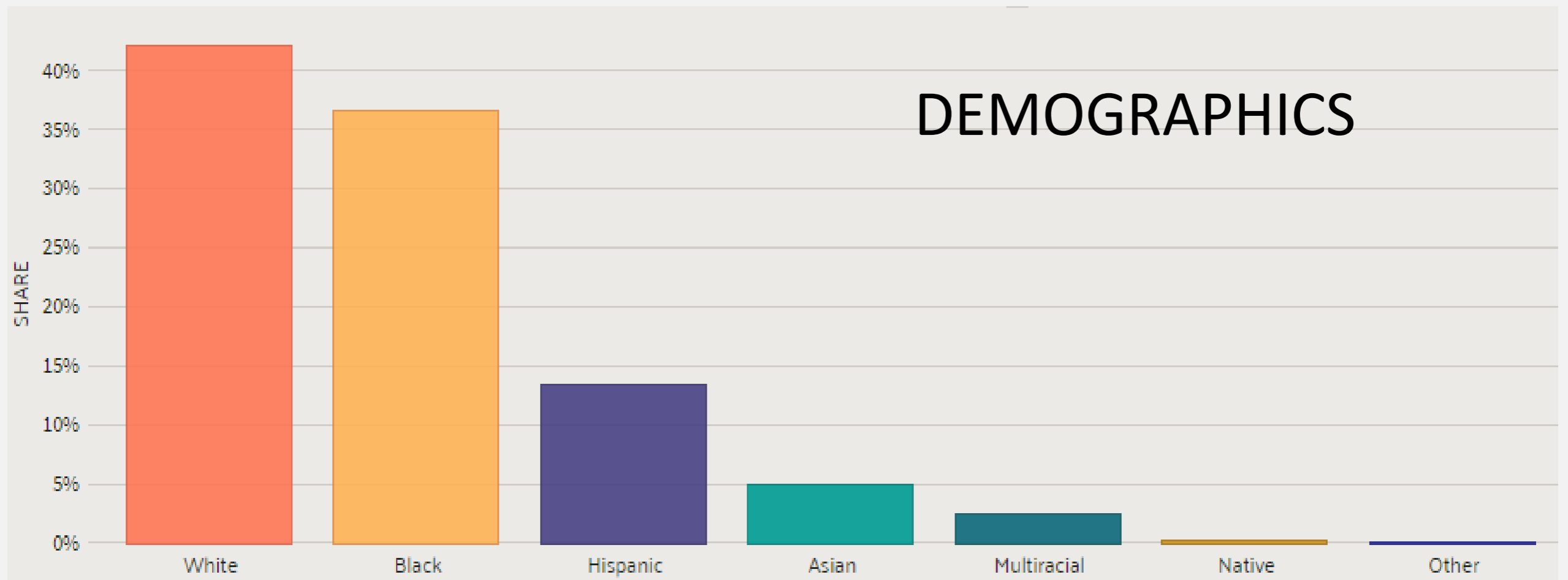
POPULATION
300,952

AREA
298 mi²

MEDIAN AGE
34.9

MEDIAN HOUSEHOLD INCOME
\$53,495

POVERTY RATE
17.3%





The Vision

Durham County: a thriving, vibrant, diverse community with abundant opportunity for all residents to live, work, learn, play and grow.

Durham County Strategic Goals

Community Empowerment and Enrichment

Provide access to educational, vocational, economic and cultural opportunities while empowering citizens to choose pathways for their own success

Health and Well-being for All

Improve the quality of life across the lifespan through protecting the health of community, reducing barriers to access services and ensuring a network of integrated health and human services available to people in need

Safe Community

Partner with stakeholders to prevent and address unsafe conditions, protect life and property, respond to emergencies and ensure accessible and fair justice

Environmental Stewardship and Community Prosperity

Protect natural resources and support and promote community and economic vitality for all residents of Durham County

Accountable, Efficient and Visionary Government

An effective organization committed to continuous innovation, exceptional customer service, transparency and fiscal responsibility

Community Issues / Opportunities for Improvement

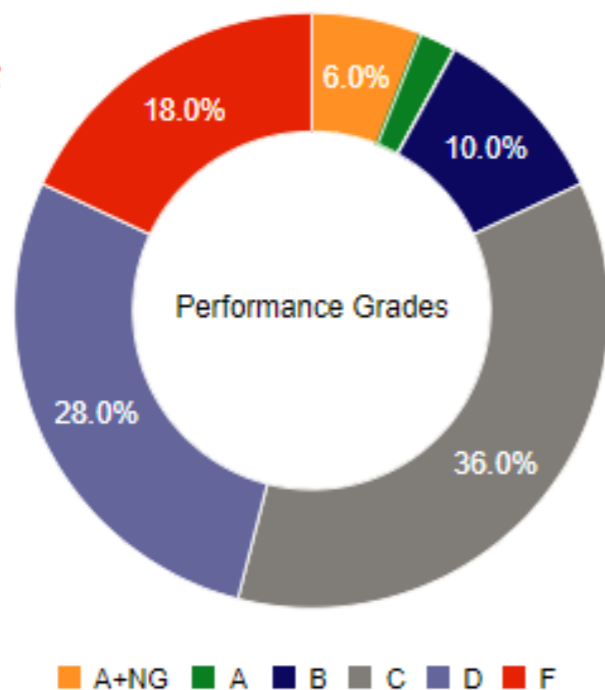
1. Low performing schools /
Improved school performance
2. Lack of economic opportunities for Youth /
21st Century Jobs skills development
3. Impaired water quality /
Improved water quality

Issue #1: Low Performing Schools

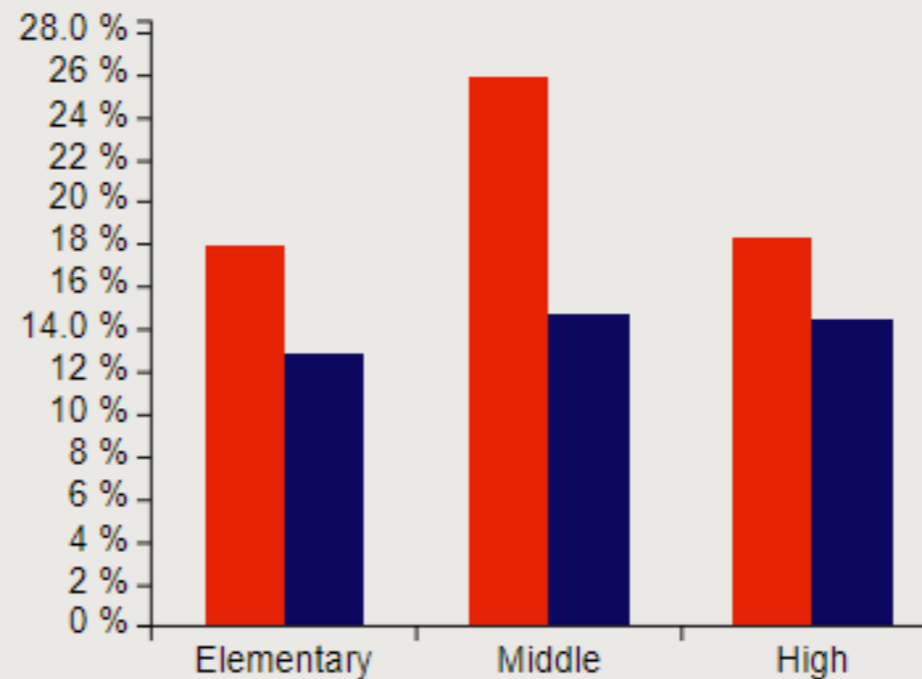
Subject	DPS % Not Meeting College/Career- Readiness	NC % Not Meeting College/Career- Readiness
Biology	60.7	52.6
English II	57.1	49.9
Math I	62	45.9
Science (Gr. 5 & 8)	40.6	37.4
English Language Arts/Reading (Gr. 3-8)	65.8	54.5
Math (Gr. 3-8)	64.9	52.4

2016-17 Overall Performance

46% D or F



One Year Teacher Turnover Rate



Durham Public Schools North Carolina

SCHOOLS STUDENTS

53 **32,907**



#2: Lack of Economic Opportunities for Youth (including disadvantaged/disabled youth)

% DPS students receiving Free and Reduced Lunch: 63.37%

Occupational Course of Study (OCS):

Modified curriculum that focuses on post-school employment and independent living. Requires modified coursework and vocational training.

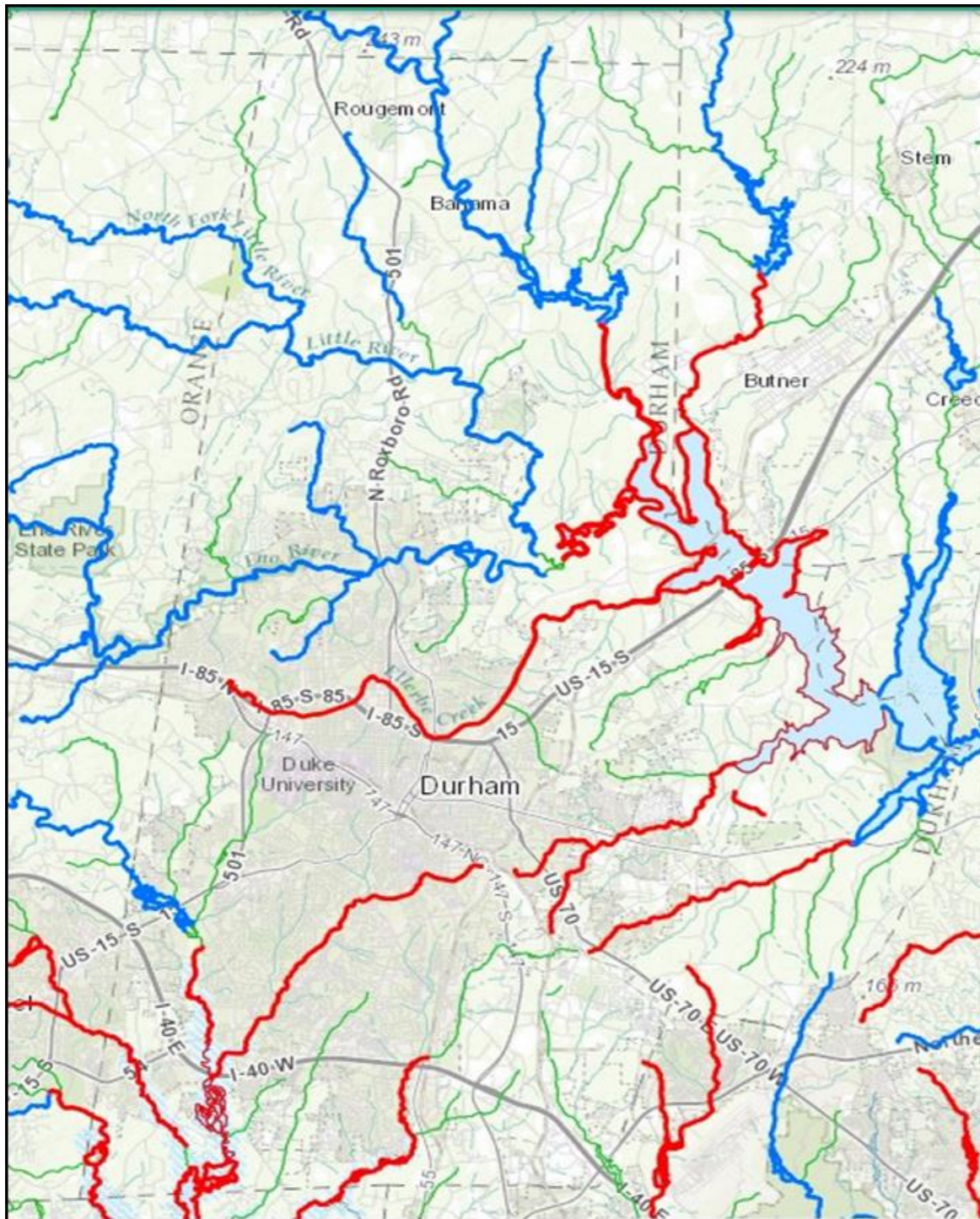
Typical jobs post-graduation:

janitors, retail store clerks, unskilled labor



#3: Poor Water Quality...

Sediment, Nitrogen & Phosphorus Pollution



CATEGORY	JORDAN LAKE	FALLS LAKE
Reductions required	35% Nitrogen 5% Phosphorus	Stage I 20% N 40% P Stage II 40% N 77% P
Rules effective	August 11, 2009	January 15, 2011
Baseline data	1997 - 2001	2006



#3: Poor Water Quality...

Sediment, Nitrogen & Phosphorus Pollution



#3: Poor Water Quality...

Sediment, Nitrogen & Phosphorus Pollution



Raise your hand if you have
partnered with your local
Soil & Water Conservation
District!



Opportunities for Community Improvement



Soil & Water

To conserve, enhance and promote Durham County's natural resources by providing citizens with technical assistance, environmental education, and economic incentives through a diversified program to meet the County's changing needs.



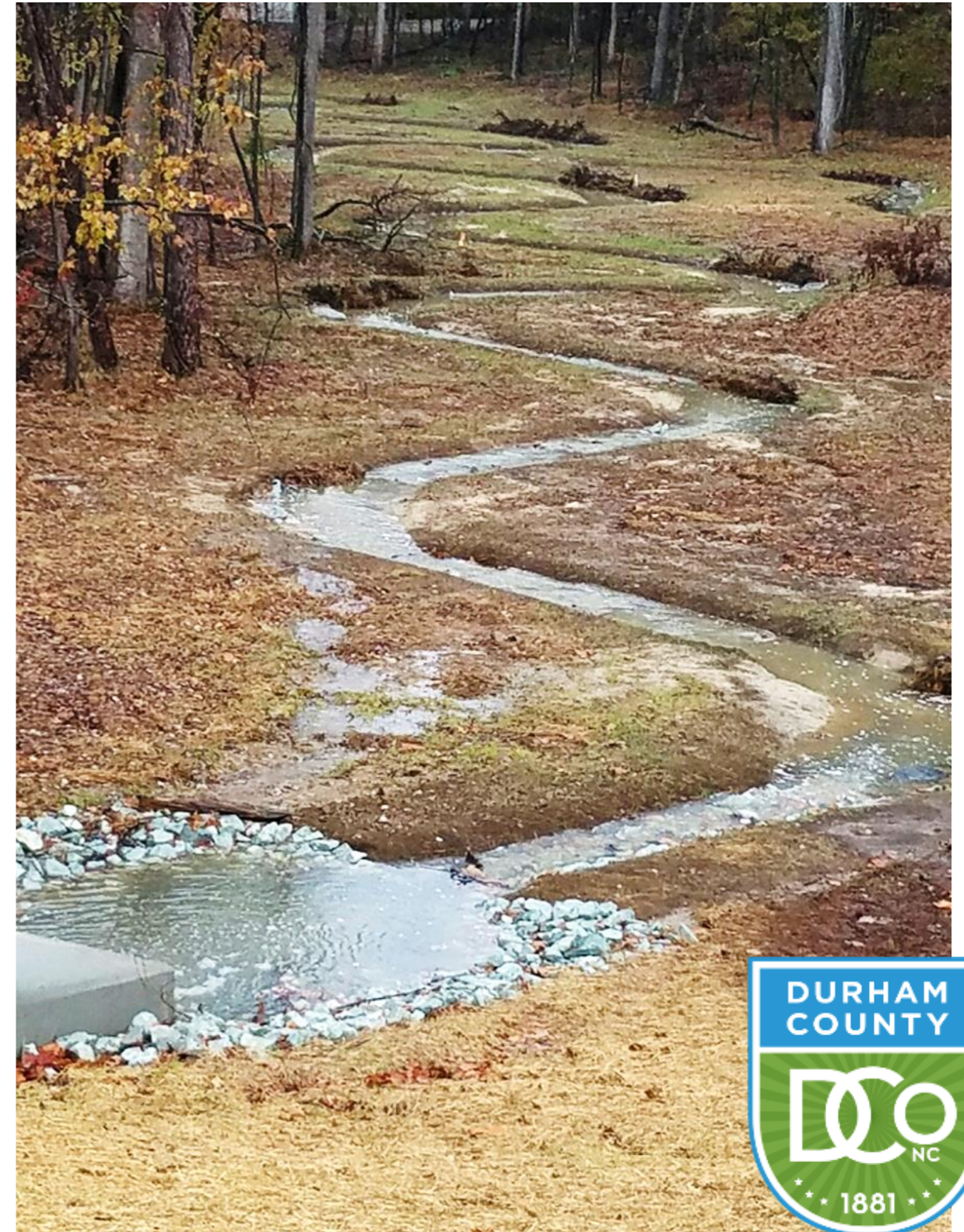
Soil & Water Programs for Water Quality

Durham Soil & Water offers cost share incentive programs to encourage voluntary installation of stormwater control measures:

- Stream Restoration & Stormwater Program
- Impaired Stream Improvement Program (ISIP)
- Community Conservation Assistance Program (CCAP)



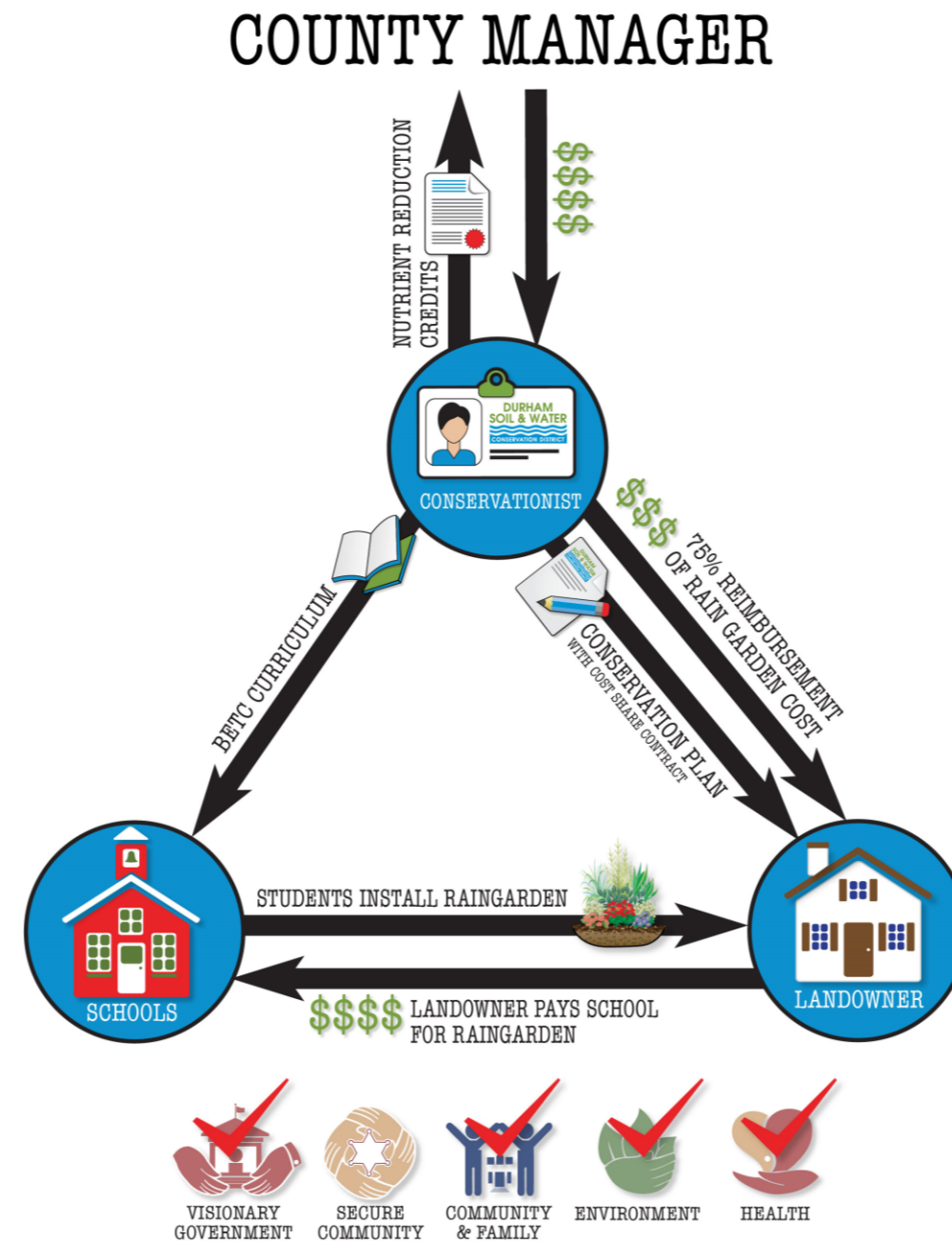
Large-Scale Stormwater Projects & Stream Restoration



CCAP/ISIP



Role Play & Table Discussion





Durham County's Bionomic Education Training Centers (BETC, pronounced "Betsy") integrates real-life work experience, practical math and science lessons, and green infrastructure design and installation training for high school students.

Do You have a stormwater
department that has a
Capital Improvement Plan?





BETC: A Strategic Plan Initiative

Strategic Goals

Community Empowerment and Enrichment

Health and Well-being for All

Safe Community

Environmental Stewardship and Community Prosperity

Accountable, Efficient and Visionary Government



BETC Engagement

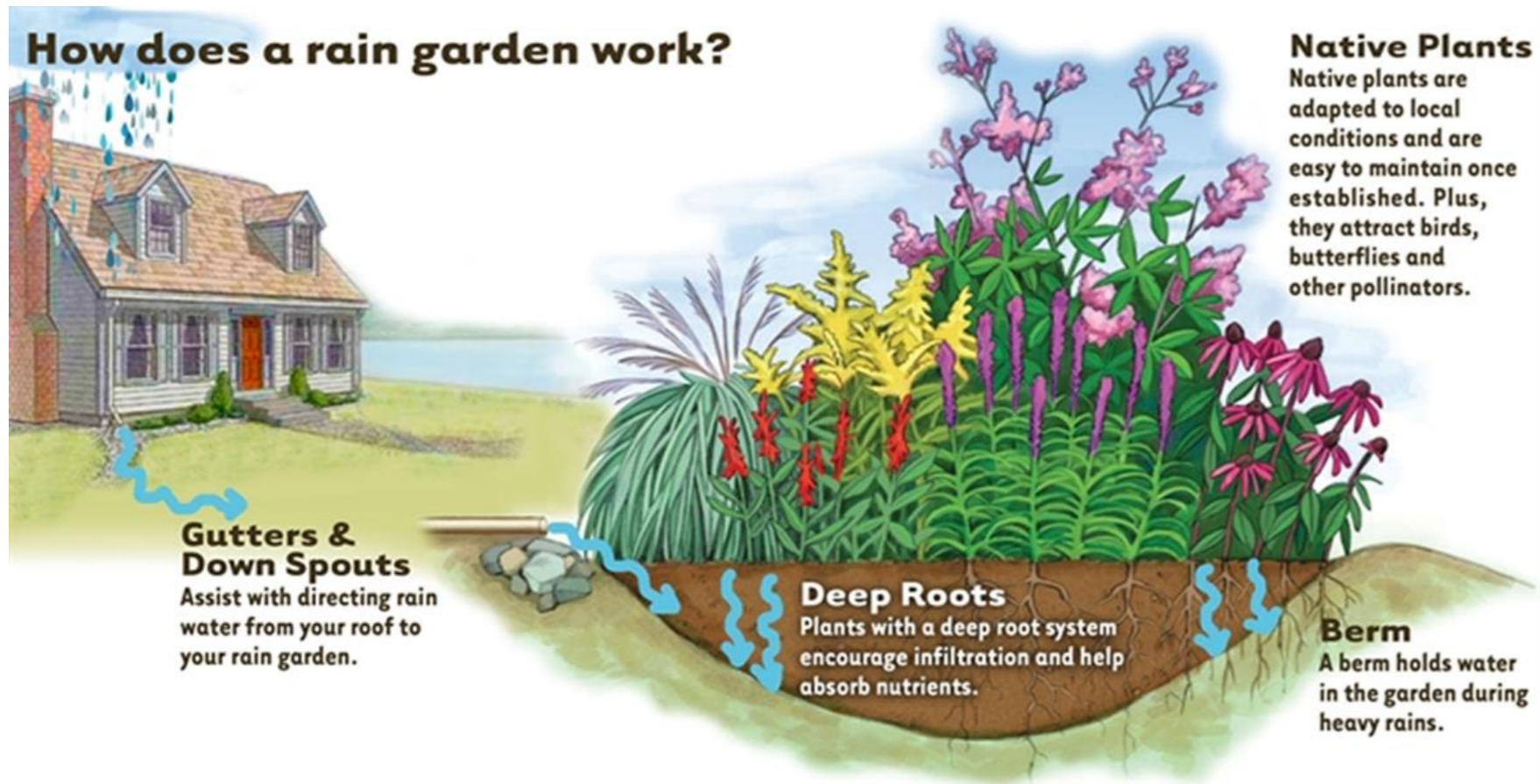
Level I : Curriculum/Teacher Training



Teachers receive training & state-approved BETC curriculum on designing and installing rain gardens and cisterns

BETC Engagement

Level I : Curriculum/Teacher Training



30-day BETC Curriculum

E-STEM focused

Target Audience: 8th through 12th grade
(may be adapted for Special Ed, Regular Ed, AP)

Experiential “Hands On”

Lessons:

- stormwater management
- soil & water quality analysis
 - nutrient management
 - energy & sustainability

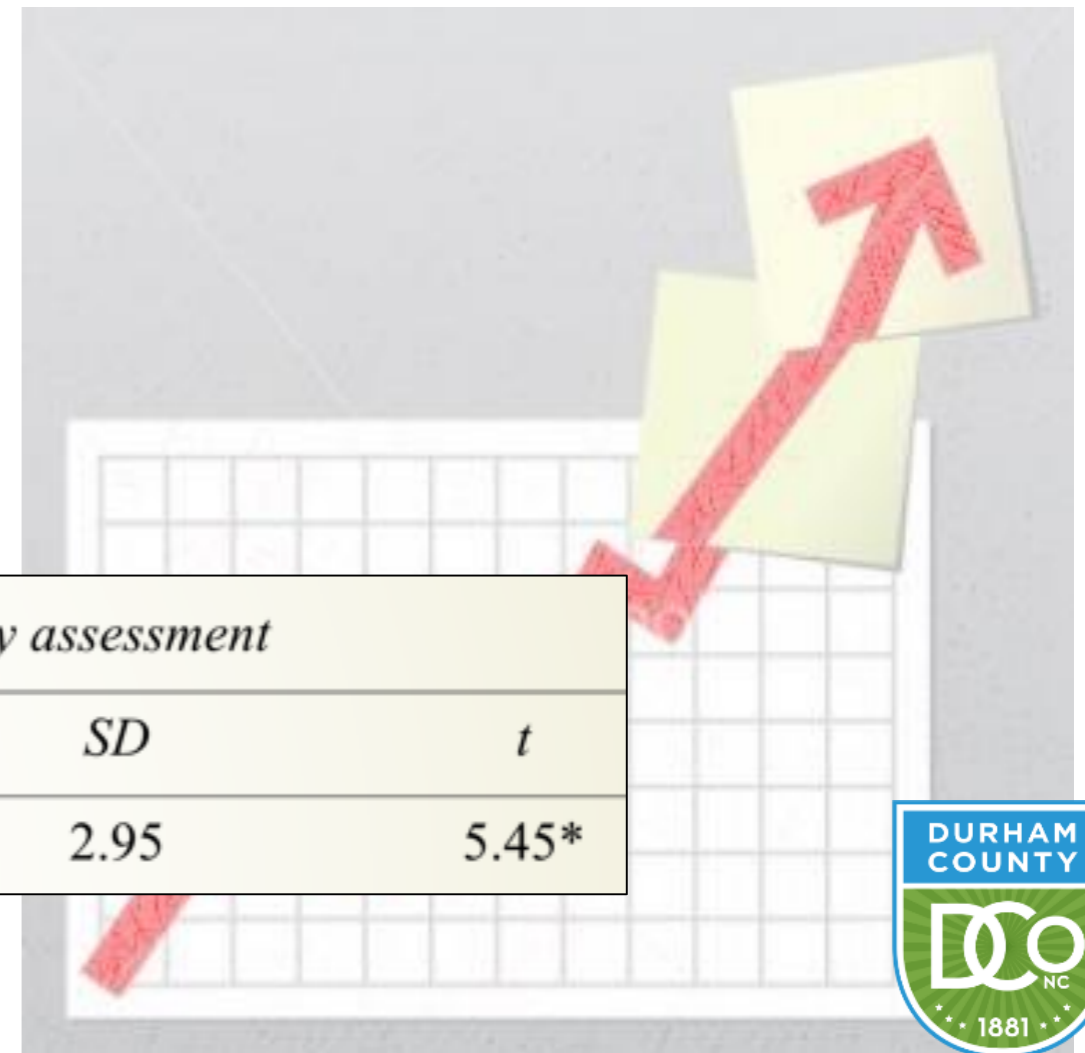


BETC Curriculum Research Project

- Implemented teacher training and a modified experiential **5 day BETC curriculum on rain gardens** for high school level courses:
 - environmental science
 - agriscience
 - special needs/OCS
- Resulted in a measurable increase in student content knowledge

Paired samples differences between pre/post Environmental Literacy assessment

	<i>df</i>	<i>M</i>	<i>SD</i>	<i>t</i>
Knowledge	40	2.51	2.95	5.45*



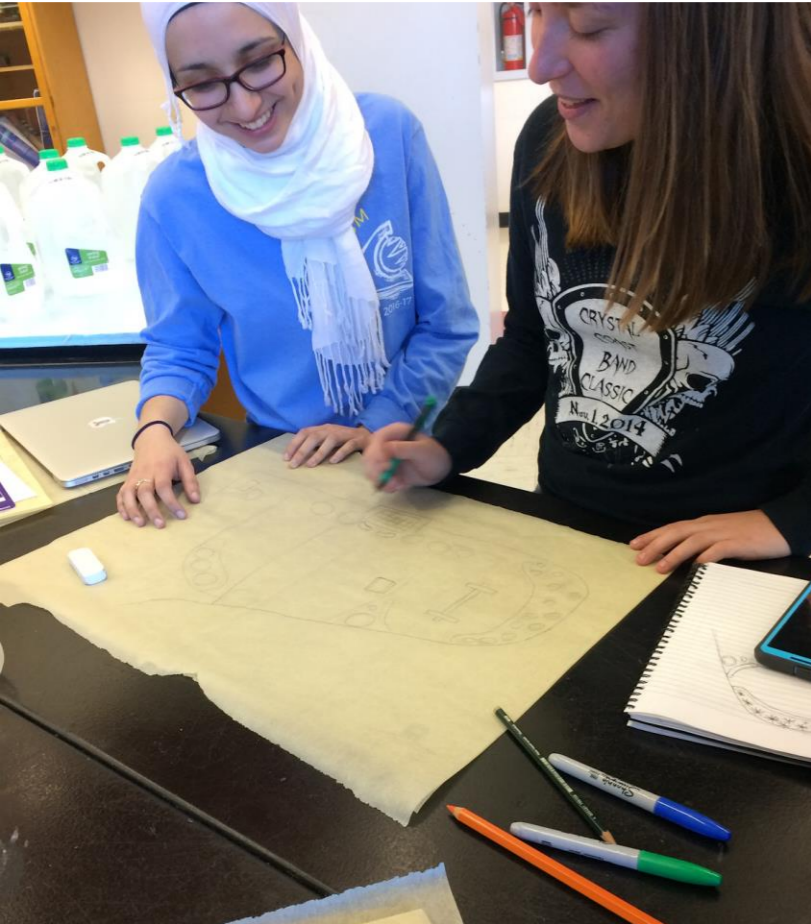
BETC Curriculum Research Project



“I love the hands on component. We spent half [of a] class doing measurements. The kids had to determine the best [rain garden] spot and they really enjoyed it.”



NCSSM "Mini-term"



Level 2: School Agribusiness

Students construct hoop houses; install irrigation, and; propagate, grow, and divide plants for community sales



Level 2: School Agribusiness



Level 3: Short-term contracted work

Students grow and install plants for contractors completing large-scale stream restoration and stormwater projects.



Level 3: Short-term contracted work

School BETC teams also work on CCAP projects such as streamside buffers and backyard raingardens.



Money earned helps sustain school programs
Students earn needed service hours



Does your local government
employ interns in the
summer?



Level 4: Summer Apprenticeship

- Extended employment for teachers
- 5-6 week paid summer apprenticeship for students
- Public & private partnerships
- Experience with stormwater project installation and maintenance, community gardens, agriculture and horticulture
- Classroom exercises and reflection
- Career exploration

Summer 2018

Partner Contributions

	Duke Energy Water Quality Grant	Duke Energy STEM Grant	EPA 319 Grant	Durham Public Schools (CTE & Maintenance)	Durham City/County Youthworks Program	Total
EK Powe ES	\$3,796	\$2,139	\$5,000	\$5,879	\$693	\$17,507
Merrick Moore ES	\$4,453	\$1,526	\$5,000	\$4,697	\$462	\$16,138
Southwest ES	\$5,149	\$1,526	\$5,000	\$4,697	\$462	\$16,834
Sandy Ridge ES	\$6,517	\$1,526	\$5,000	\$4,697	\$462	\$18,202
Hope Valley ES	\$5,230	\$1,526	\$5,000	\$3,171	\$462	\$15,389
DPS Hub Farm	\$1,355			\$2,833	\$1,155	\$5,343
Bull City Farm		\$360		\$570	\$231	\$1,161
Monroe Farm		\$1,080		\$1,040	\$924	\$3,044
Owens Farm		\$360		\$570	\$231	\$1,161
Zeimer Farm		\$720		\$570	\$231	\$1,521
Training		\$6,337		\$23,631	\$5,887	\$35,855
Total	\$26,500	\$17,100	\$25,000	\$52,355	\$11,200	\$132,155

Level 4: Summer Apprenticeship



Training



Rain Water Harvesting Training



NC Cooperative Extension Residential Rain Garden Certification Class & Exam



Field Survey Training



Stormwater Project Installation



Before & After
Rain Garden & (Sod) Critical Area Planting



Riparian Buffer



Cistern



Stormwater Project Maintenance



Vegetable Garden Establishment/Maintenance



EK Powe Elementary



Birchwood Community Center



Morehead Montessori



Northern High School



Career Exploration



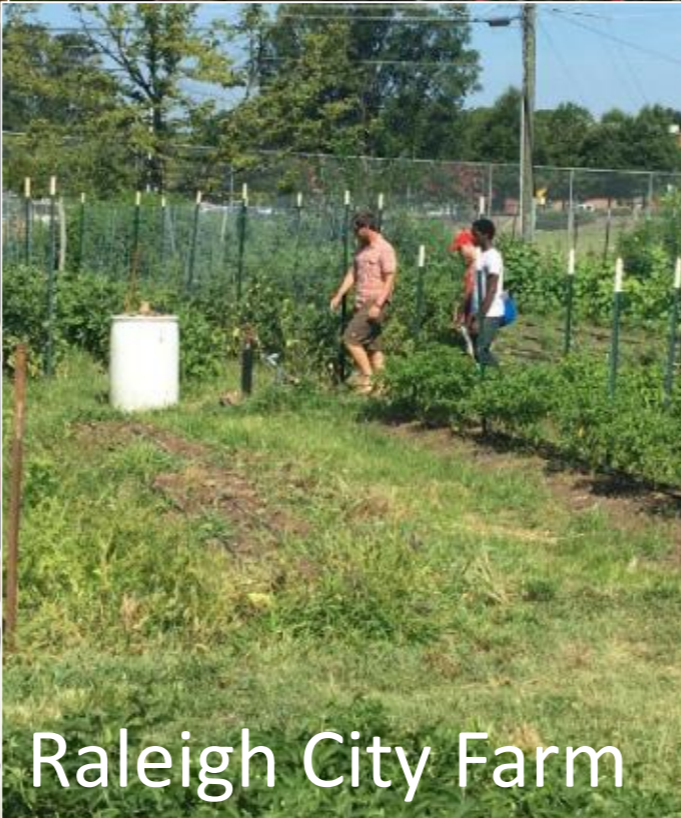
Pura Vida Farm



Plantworks Nursery



Endless Sun Produce



Raleigh City Farm



Heeks Farm





Durham County Soil & Water Conservation District

<https://www.youtube.com/watch?v=oRSw5GfSWI8&feature=youtu.be>

Thank you!



<http://dconc.gov/SWCD>



Soil & Water

Thank you!



<http://dconc.gov/SWCD>



Soil & Water