



## **BRONX YOUTH URBAN FORESTRY EMPOWERMENT PROGRAM** **EVALUATION**

**A Trees New York program, conducted in partnership with:  
US Forest Service Northern Research Station,  
New York City Housing Authority Garden and Greening Program,  
Mosholu Montefiore Center**

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## **EXECUTIVE SUMMARY**

**Introduction:** The Bronx Youth Urban Forestry Empowerment Program offered an opportunity for a two month, in-depth and field based urban forestry work experience for low income and largely minority teenagers in the Bronx. The goal of this evaluation is to understand participant outcomes as a result of taking part in this program. Evaluation consisted of: supervisor and NRS research technician's participant observations that were conveyed over the course of the summer via periodic interview; a pre and post test questionnaire; and weekly public essays.

### **GENERAL PROGRAM SATISFACTION**

- There was a 95% retention rate, with only one student relieved for behavioral issues
- There was a high degree of general program satisfaction on the part of all participants
- 100% of participants said that the program helped them their goals for the summer
- 93% of participants said they would recommend the program to someone else
- 88% of participants rated the project as an "A" and 12% rated it a "B"
- Participants most enjoyed participating in hands-on activities, and disliked lectures
- Program staff noted some staffing, logistical, and curriculum challenges

### **ENVIRONMENTAL AWARENESS**

- There was a large increase in understanding of tree identification, tree biology, and tree pruning
- Participants' stated understanding of the benefits of natural resources to New York City and their neighborhood did not change dramatically from the pre to the post test
- The most commonly identified benefit of natural resources and the most commonly identified role of the forest was to "provide oxygen / clean the air"
- The percentage of respondents who could name a "green collar" job title or task increased from 39% to 94% over the course of the program
- Though their initial understanding of environmental processes was limited, all participants displayed an ability to synthesize concepts and present an overview of their experience in a final, public presentation

### **ATTITUDES**

- The majority of youth already enjoyed being outdoors prior to participating in this project; and their favorite activities include active and passive recreation and socialization
- There was a statistically significant increase in measures of self-confidence and self-efficacy over the course of the summer
- There was some evidence of an increase in personal or social values of the environment related to art, beauty, and inspiration; as well as evidence of an increase in a "conservation ethic"

### **STEWARDSHIP BEHAVIORS**

- Questions were asked to establish a baseline for potential long term monitoring: signing a petition and planting a tree were the least common stewardship behaviors; turning off lights and recycling were the most common
- The number of participants who could identify having done something for the environment increased from 70% to 88%; the greatest increase reported was in working with trees, followed by not littering or picking up garbage

### **Recommendations for improvement:**

- Field-based work with 20 teens requires at least 2 full-time adult supervisors
- Logistics of meeting site availability, materials, computers, etc. must be finalized 1-2 weeks in advance; including better coordination with recruiting agency
- Stronger curriculum planning will help the project run smoother and will ensure that each participant is meaningfully engaged at all time
- If the FS has an interest in teaching more about ecological systems, NR management, and rural-urban linkages, then greater emphasis needs to be placed in these curriculum areas
- Formalized next steps and follow-up with participants would help to improve impact of the program and continuity into the school year

## **BRONX YOUTH URBAN FORESTRY EMPOWERMENT PROGRAM EVALUATION**

### **Introduction:**

The goal of this evaluation is to understand participant outcomes as a result of taking part in the Bronx Youth Urban Forestry Empowerment Program, as well as to set up a baseline for a potential longitudinal study. The evaluation focuses on the following three areas:

- **ENVIRONMENTAL AWARENESS:** To what extent did participants' environmental awareness change in terms of: NYC urban ecology; urban-rural linkages; environmental systems thinking (at multiple scales); environmental benefits; and green collar jobs?
- **ATTITUDES:** How did participants' attitudes change in terms of self-confidence / self-efficacy; interest in being outdoors; and excitement about working or playing in a natural environment?
- **STEWARDSHIP BEHAVIORS:** What changes in participants' environmental stewardship behaviors were observed? Much of this cannot be determined without long term monitoring.

**Methods:** Evaluation consisted of: supervisor and NRS research technician's participant observations that were conveyed over the course of the summer via periodic interview; a pre and post test questionnaire; and weekly public essays. See appendices for a related literature review and full copies of the evaluation instruments.

### **I. Participant Demographics**

- The summer program consisted of 19 students, five girls and 14 boys. Initially, there were 20 students enrolled in the program but one student had to be released after the first week due to disciplinary problems (leading to a 95% retention rate).
- The mean age of all participants was 15 years old, with a range of ages from 14-18.
- In terms of race and ethnicity, 41% of participants identified as Hispanic only; 35% identified as Black or African-American only; 23% identified as more than one race or other.
- English was the primary household language of 59% of participants; 23% spoke both English and Spanish at home; and 12% spoke primarily Spanish at home.
- A number of students self-reported to the project supervisor that they lived in foster care, group homes, or single parent homes
- According to self-reported information to the project supervisor, one student was autistic and 4 students were taking medication for ADD/ADHD

### **II. General program satisfaction**

In addition to the above-named areas of evaluation, some basic program satisfaction questions were also asked in the post-test only. Taken together, these measures indicate a high degree of general satisfaction with the summer work experience. Of the 15 respondents to the question of whether they would recommend the program to someone else, 14 (93%) said that they would; one person (7%) said that they would not. Students were asked to explain why they came to that decision, and the responses are illustrative of what the students liked about the project: learning, working as a team, helping the environment, and helping their communities:

*"Because it is a really good program and you learned a lot."*

*"Because I enjoyed it. To me it's like a big family..."*

*"Its fun and you do things that you'll look back on and say, 'Wow, I did that.'"*

*"Because this will help care for the environment."*

*"Learn and help the city."*

*"It is a lot of fun and it changes the way you see the environment."*

They were also asked to assign letter grades to the overall experience, their supervisor, mentoring received, services provided by TNY, and the work environment. The results of this are presented in the table below as percentages of total respondents. It is worth noting that in terms of the overall experience, 88% of students rated the project as an A and 12% rated it as a B. Complete results are shown here:

<b>RATING OF SUMMER EXPERIENCES (% respondents)</b>					
	<b>OVERALL</b>	<b>SUPERVISOR</b>	<b>MENTOR</b>	<b>SERVICES</b>	<b>WORK ENVIRO</b>
A	88%	71%	69%	69%	56%
B	12%	12%	13%	25%	44%
B-		12%	6%		
C		6%	13%		
D				6%	

In their first weekly essay, students were asked to describe what they liked and disliked so far about the project. These responses were content analyzed and clustered together to identify common themes.

- In terms of likes, the most common responses related to hands-on activities, such as working with trees, using tools, pruning, and doing tree identification. Participants also cited that they enjoyed learning new things about trees, pruning, and the environment. Several specifically mentioned that they liked working out side in the fresh air. Finally, though cited by fewer participants, some acknowledged that they enjoyed improving the environment, improving their community, and working with their supervisor.
- Overall, there were far fewer dislikes than likes that were identified. The most common dislikes were the guest lectures, which were considered “boring”, but also sometimes “necessary.” Others cited some concerns with being out in the environment, including sun, heat, and insects. Related to that, were dislikes of physical discomforts like sweating and standing. There were a few isolated concerns that were identified by one student each, including: memorizing trees; challenges with group dynamics; not enough tree work to do; and “not getting paid fast enough”.

In their last essay question, students were asked: “Did this program help you meet any of your goals? Why or why not? What might you do differently with regard to the environment as a result of participating this program – if nothing, why not?”

- All 12 of the students who completed this essay said affirmatively that this program had helped them meet their goals
- In terms of meeting their goals, again the highest emphasis was on learning (about trees, the environment, and science). Other prominent goals included taking trips, having fun, and being active. Students also listed social goals related to teamwork and making friends. Finally, students mentioned that the program gave them self-confidence and made them proud.
- In terms of what they might do differently, responses were of three types: 1) people said they would behave differently towards the environment now by appreciating it more or treating trees with respect; 2) they would tell others about the environment and how to behave, such as not littering or not allowing dogs to urinate on trees; 3) they would do something ‘in the future’ such as volunteer or work in this field.

The supervisor’s was asked to focus on the greatest challenges to the overall success of the project; his concerns focused largely on supervisory, logistical, and programmatic issues.

- Because of the nature of fieldwork, he was not able to divide the 19 students into teams and let them out of his sight; all students needed to be supervised at all times; and the program was understaffed. Staffing challenges were greatest during the first 2 weeks of the program, when the “tone” of work was set, and prior to the daily assistance by additional FS and TNY staff.
- In terms of the substance of the program, the main task for much of the summer was conducting a tree inventory, but the group was hindered by the speed of old technology, as a group of students would have to wait for a GPS unit to lock in the signal. This left unstructured downtime with nothing for students to do, which then lead to behavior challenges. The supervisor improvised his weekly work plan without strong guidance on curriculum and program intent from

the organization. Given his prior background in field restoration and education he was able to bring educational experiences to the youth, but a less ambitious project leader might not have been able to be so resourceful. The NRS research technician stated,

*“If [the supervisor] wasn’t there, the project would have collapsed. I can honestly say that I’ll carry the memory of him with me for awhile. He was thrown into the project without a lot of support, and a lot of people would have given up, but he didn’t.”*

- Lastly, the supervisor felt that the students were most engaged when they were doing hands-on maintenance and tree care work; when they were taking their field trips; and when they were writing or preparing their final presentation. Students were not very responsive to being lectured.

### III. Environmental awareness

#### A. NYC Urban Ecology

Participants were asked, “Please describe the natural resources in your neighborhood. What role do things like parks, gardens, trees, and rivers play in your neighborhood?” For the most part, there was a great deal of consistency across the pre- and post-test in response to this question. Most of the responses were primarily positive, and in both cases providing oxygen was the most commonly identified role for natural resources. Clustered responses are listed in rank order, with the counts of respondents offering these examples listed alongside each. Negative or “unknown” responses are listed in capital letters.

ROLE OF NEIGHBORHOOD NATURAL RESOURCES (# responses)			
PRETEST		POSTTEST	
Oxygen	9	Oxygen / clean air	6
Shade / cool	5	Habitat / animals / wildlife	5
Play / fun	5	Beauty	3
Beauty	3	Shade / cool	3
Animals / insects / fish	3	Water / stop runoff	3
Food	2	Food	2
Relax	1	Recreation / hiking	2
Water	1	Relax	1
Help neighborhood	1	Memorials	1
Help environment	1	Bark	1
NO ROLE SPECIFIED	2	Improve neighborhood	1
NOT MUCH	2	NO ROLE SPECIFIED	3
POLLUTED	1	NOT MUCH / NO	2
DON'T INTERACT	1	NO RESPONSE	1
DON'T KNOW	1		

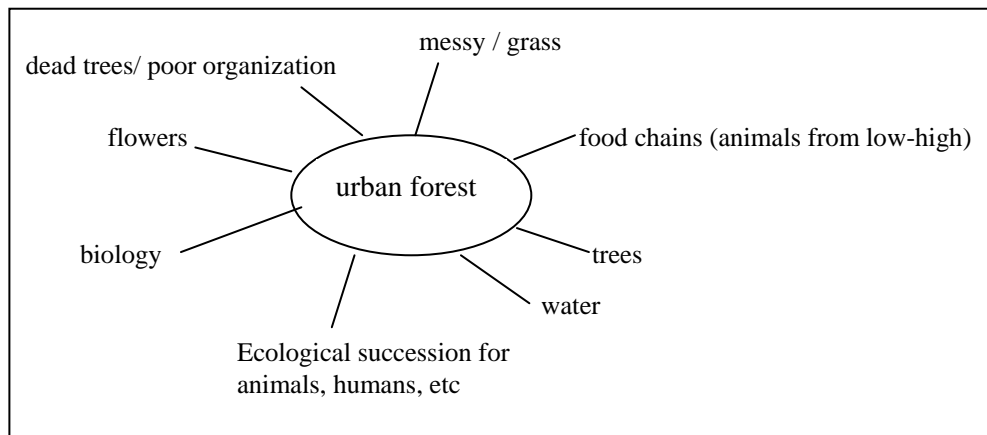
Participants were also asked to describe natural resources in New York City. This question was intended to examine environmental thinking at multiple scales (neighborhood, city). The responses did not substantively differ from those given to the question of natural resources in a neighborhood. This may suggest that students’ do not perceive many differences between neighborhood versus city natural resources. The repetitive wording of the questions and the sequential order of the questions in the instrument may also have had some effect on the responses.

Finally, participants were asked to draw “concept maps” about the term *urban forest*. This was intended to allow students to answer a question in a less verbal way, to map out their mental concepts related to this term. It was also intended to explore different types of learning and communication. The results of these concept maps are best compared through content analysis of terms used, but for this preliminary evaluation report one can also examine raw counts of the numbers of concepts drawn on each map in the pre and post test. The number of respondents who simply said “don’t know”

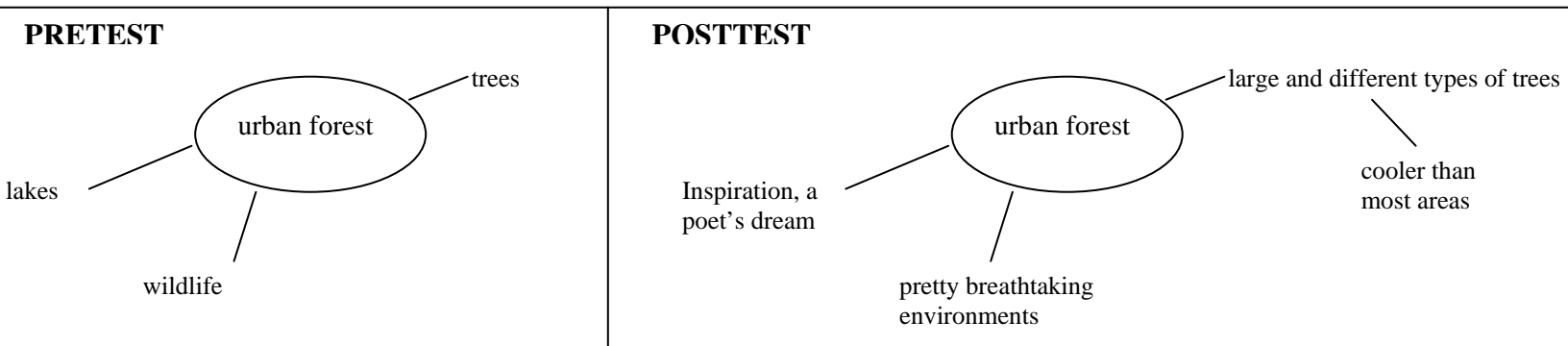
CONCEPT MAP (# respondents)		
# terms	PRETEST	POSTTEST
1	0	0
2	0	0
3	1	4
4	6	7
5	1	0
6	0	1
7	1	0
8	2	1
9	2	1
10	0	1
don't know	6	4

declined from 6 to 4. There is not a demonstrable increase in the number of terms identified from pre to post-test.

Students were given an oval with the words “urban forest” inside as a starting point for their maps. Presented here are two examples of maps that showed a large degree of change from the pre to post test. In the first case, the participant went from giving no response to the concept map, to illustrating 8 different concepts, as shown at right:



In the second case, below, the pure number of terms did not change dramatically, but the emotional content of the attachment to the urban forest certainly did, which shows more of a change in environmental attitudes, than awareness, per se.



The observations of the supervisor and NRS research technician are instructive here as well. When the Supervisor was interviewed after the first week, he noted that it was clear that many of the students had not learned any of this material before. It seemed only one or two participants had any interaction with community gardens, botanical gardens, or other local natural resources that could provide a personal knowledge-base. He felt that the material was completely new to at least half of the students, including basic environmental science education.

By the end of the summer, every student participated in the final presentation which spanned everything they learned from doing tree inventory; tree care and maintenance; and field trips. It was apparent that students had learned about a wide range of topics primarily focused on trees, including: tree identification, pruning, and tree biology. The NRS research technician agreed with the Supervisor's observations. Students worked more efficiently and effectively as the summer progressed with less and less supervision. They learned species names, species codes, and knew how to operate the GPS with ease.

**B. Rural-Urban Linkages**

Participants were also asked to describe how forests affect cities, both positively and negatively, and to provide examples. As with the role of nature resources in their neighborhood, the top identified impact of forests on cities was to provide oxygen and clean the air—in both pre- and post- test. Also frequently noted was the role of forest as habitat and to protect biodiversity. There are not substantive differences in the types of responses before and after the program, though there is a wider range of responses in the post-test, including concepts of beauty/views, cleaning water, and more respondents identifying forest products. (Responses that did not directly address the question are noted in italics.)

AFFECT OF FOREST ON THE CITY (# respondents)		
PRETEST		POSTTEST
Provide Oxygen / take in CO2	7	Clean air / provide oxygen 6
Habitat / wildlife / biodiversity / animals / plants	7	Provide habitat / wildlife 5
General environmental benefits / positive not specified / natural resources	5	General environmental benefits / positive not specified 4
Don't know	3	NO RESPONSE 2
Doesn't affect / city affects forest	2	Food 2
Negative / takes space from city	1	Shade / cool 2
Forest products - cut down trees	1	Beauty / views 2
Connected to city	1	Water 1
<i>Need to protect</i>	1	Forest products - lumber / paper 3
<i>Hard to maintain</i>	1	Negative / takes space from city 1
		Disease 1
		Don't know 1
		<i>Need to preserve</i> 1

The final presentation, again, showed evidence of learning about the role of forests that is not shown in these test. Students discussed what they did on their trip to Black Rock Forest and what they learned about the role of altitude on tree habitat, and the impacts of the forest on water quality.

### C. Green Collar Jobs

One area of environmental awareness that the group hoped to increase was an awareness of green collar jobs. From the pre- to the post-test there was a large increase, from 39% to 94% in the number of respondents who could name a job title or task in response to the question "Give at least one example of a 'green collar job'".

Of those who did respond, since the pre-test was administered after the first week of the summer employment, all of the responses to this question in the pretest made reference to foresters, arborists, pruning, or Trees NY. In the post-test, students again most commonly referenced forestry and pruning, but also had a wider range of examples, including:

*"environmental biologist"*

*"forestry"*

*"pruning and tree climbing"*

*"gardener"*

*"eco fashion designer"*

Finally, feedback on green collar jobs was given during the onsite presentation given by NRS researchers. This presentation and discussion was recorded and can be analyzed to determine trends in youth's awareness, attitudes, and interests towards this field.

## IV. Attitudes

### A. Environmental Attitudes

Measuring attitudes is a challenging endeavor, as there are no "correct" answers, thus, it was important to use a number of different question forms. According to the questionnaires, attitudes towards the environment did not change in a direct measurable way, for the number of students who "like being outdoors" was high: 16 (94%) in the pretest as well as the posttest: 15 (88%). There was no change in

the one respondent who disliked being outdoors, but there was a slight increase in non-respondents to this question. The pretest offers evidence of why students already liked being outdoors: seeing plants and animals; access to fresh air; socializing with friends; and playing outside:

*“What I like about outdoors is the trees and the beautiful colors of different plants.”*

*“Yes, I love being outdoors. I love nature and being outside with plants and animals. I enjoy spending time doing outside doing outdoor activities”*

*“Chill with my friends”*

*“I’m able to not feel bored at home”*

*“Yes, the breeze and fresh air.”*

To increase the specificity of these responses, participants were asked to list 1-3 things that were their favorite things to do outdoors. Responses were aggregated and the counts are presented in rank order in the table at right. From the pretest to the posttest, the ranking of these categories remained approximately the same, but there was an increase in respondents who identified enjoying nature, in terms of seeing wildlife, trees, rivers, and learning about nature. There was also an increase in respondents identifying work, tree identification, and making money as their favorite things to do outdoors. This offers some evidence of participants identifying their summer work experience as their favorite thing to do outdoors.

<b>ACTIVE RECREATION</b>	<b>16</b>
Play sports	10
walking / hiking	4
go to camp / camping	2
<b>PASSIVE RECREATION</b>	<b>11</b>
eat / picnic	4
read a book	1
chill/ relax / sit / lie down	6
<b>SOCIALIZING</b>	<b>5</b>
<b>TRAVEL</b>	<b>4</b>
<b>ENJOY NATURE (trees, birds, river)</b>	<b>3</b>
<b>PARK VISIT / GENERAL / NOT SPECIFIED</b>	<b>3</b>
<b>MOVIES / SHOPPING</b>	<b>3</b>
<b>WORK</b>	<b>1</b>

Participants also explained what they *dislike* about the outdoors. Overall, there were fewer responses (13) to this question than to what people *like* about the outdoors, which offers further support for the notion that these students already liked being outside. The most common response was: insects, followed by: pollution or poor environmental quality, bad weather, and—in one case—violence.

*“I’m not really sure what I hate except for the bugs that bite, like mosquitoes, gnats and bees.”*

*“The only thing I do not like is the pollution, noise, and limited displays of nature that exist in the city”*

*“I don’t like that the outdoors is so dirty. I wish people would take care of it.”*

*“I don’t like too much heat or too much cold.”*

*“I don’t like being around shoot outs.”*

*“No, because there’s too much noise and pollution.”*

Again, the question was rephrased to ask respondents to offer 1-3 examples of what they find challenging or uncomfortable about the outdoors. It is noteworthy that throughout both instruments, many



respondents did not identify anything that they find uncomfortable or challenging (5 in the pretest, 6 in the posttest). In the pretest, responses were divided roughly evenly between natural discomforts such as insects and itching plants; people like gangs and strangers that are encountered on the street; and issues of poor environmental quality. The issues of environmental quality and the fear of gangs and strangers may be particularly salient in this low income, urban environment and can be compared to responses from other geographic areas.

In the posttest, the reported fear of gangs and strangers declined. One could hypothesize that this was the result of greater interaction with the outdoors, leading to a decline in fear of unknown people present outside. Perhaps as the participants engaged in caring for their local landscape, they were able to mentally “reclaim” the right to this space. However, this is only a hypothesis and mechanisms would need to be further examined via interview. Finally, it is worth noting that “work” was mentioned in both cases as a challenge, rather than a discomfort.

	PRETEST	POSTTEST
<b>Natural elements</b>	<b>9</b>	<b>9</b>
Insects (stinging, biting)	4	6
Itching plants / thorns	3	0
Bad weather (heat)	2	3
<b>People</b>	<b>7</b>	<b>1</b>
Gangs	5	1
Annoying people/strangers	2	0
<b>Poor environmental quality</b>	<b>6</b>	<b>4</b>
noise	1	1
dog feces	1	0
not enough space	1	0
graffiti	1	0
trash/ littering/ pollution	2	3
<b>Nothing</b>	<b>5</b>	<b>6</b>
<b>Work</b>	<b>0</b>	<b>2</b>

It is quite possible that the questionnaire instrument does not capture all of the subtle shifts in environmental attitudes that may have occurred over the course of the summer. Thus, it is important to pair these results with the essay responses. In the fifth week of work, students were asked “This week, did your opinions changes about trees, forests, and the environment? How? If they didn’t change, why not?”:

- Four respondents identified prior opinions that they once held, including that trees used to not matter to them; they used to not like trees; they were scared of trees; they used to think nothing was being done to help the environment.
- The most commonly cited way in which opinions changed referred back to awareness-raising and learning. Quite simply, these youth reported learning about the importance of the environment, trees, the forest, and biodiversity. Some mentioned that they would share with others what they had learned.
- Several respondents espoused a conservation ethic, including liking the environment and wanting to protect it; liking the forest and finding it enjoyable; and having a “grateful outlook” towards resources and habitat. A few respondents made reference new innovations that excited them, such as green buildings; the use of green products by corporations; and the Million Trees Campaign in New York City
- Some students were surprised that the government is involved in environmental protection and that there are lots of people out there who care about the environment.

- Two respondents said that they didn't learn anything new or that all trees *still* seemed the same to them, except the ones they had pruned.
- In response to the question of why these opinions changed, the most commonly cited reasons were the trip to Black Rock Forest and the Green Collar Presentation, both of which happened in that week of the course. Many noted that their opinions had *not* changed, because they were already pro-environment in that they "love trees", want to "protect the forest", need to "preserve nature". Some noted that this experience reinforced previously held beliefs.

The field observations of the NRS research technician support the notion that there was an attitude change over the course of the summer for the majority of the participants. He felt that the project "planted the seed of environmental participation" as evidenced by the group's ability to work more independently and enthusiastically as the summer progressed. He also noted that students began to incorporate environment and tree-related words into their casual dialogue and even jokes, an interesting indicator of attitude change.

In terms of challenges, he specifically noted that there were only two students who seemed to treat the job as a job and nothing more, who didn't make the connection to an environmental ethic or see the benefits of what they were learning. In both cases these you had "other life issues that stood in the way", such as living in a group home. This shows the real challenges that are presented in working with low-income and marginalized communities, suggesting the need to bring in partners with social work and social services background.

In discussion with the project supervisor, he noted that from the beginning of the program all the participants enjoyed being outside and recreating in nature. He felt that certain students had a deeper attachment to and understanding of nature than their peers when they started, and this only increased over the summer. However, he did begin to observe subtle across the whole group. He saw their interest in the subject matter increase through the hands-on work of tree inventory and tree care. He said,

*"Do I feel they've been changed for the better? On the whole, yes. Between camaraderie, making new friends, have learned very specific things they wouldn't have learned had they not participated in this program. They look at the natural world differently. They recognize it more."*

### **B. Self-confidence and self-efficacy**

The program was developed around a youth empowerment model, whereby giving participants responsibilities and paid work helps them to develop self-confidence. Overall, general self-confidence measures in terms of feeling good about oneself and being proud of oneself were high, across both the pretest and the posttest. Sense of self-efficacy in terms of being a good leader and successfully completing things was also high, though slightly less so than the self-confidence measures. In terms of structuring future locally based urban environmental programs, it is interesting that respondents more strongly agreed that they could make a difference in the *world* than they could in their *own communities*. It seems that abstract global challenges are perceived as more manageable than intractable local ones.

SELF-CONFIDENCE (mean scores)		
	PRETEST	POSTTEST
FEELGOOD	8.28	9.32
PROUD	8	9
LEADER	6.78	7.71
TURNOUT	6.97	7.82
HAPPY	7.33	8.35
WORLD_DIFF	5.78	5.88
COMM_DIFF	5.06	5.29
n	18	17

Quite notably, from the pretest to the posttest, there were increases in the mean scores of *all* the measures of self-confidence and self-efficacy. The following statements were evaluated on a 10-point likert scale, from 0 for strongly disagree to 10 for strongly agree (variable names are shown in parentheses and means listed in table at right):

- *I feel good about myself (feelgood)*
- *I have a lot to be proud of (proud)*
- *I am a good leader (leader)*

- *Most things I do turn out well (turnout)*
- *I am happy with the way I can do most things (happy)*
- *I can make a difference in the world on my own. (world)*
- *I can make a difference in my community on my own. (comm.)*

A t-test found two of these differences to be significant at the  $p < .05$  level and two were significant at the  $p < .1$  level. In many ways, this can be considered a more critical outcome than any immediate change in environmental awareness or attitudes. In this youth empowerment model, self-confidence is the platform upon which students will later build their specific interests and careers.

SELF-CONFIDENCE CHANGE FROM PRE TO POSTTEST						
Variable	Mean	N	Variance	Std Error	t Value	Pr >  t
difffeelgood	0.9117647	17	2.3823529	0.3743506	2.44	**0.0269
diffproud	0.9411765	17	3.6838235	0.4655056	2.02	*0.0602
diffleader	0.7647059	17	2.8161765	0.4070104	1.88	*0.0786
diffturnout	0.6470588	17	3.4926471	0.4532657	1.43	0.1726
diffhappy	0.9411765	17	3.3088235	0.4411765	2.13	**0.0487
diffworld	0.0588235	17	4.1838235	0.4960920	0.12	0.9071
diffcomm	0.5294118	17	10.5147059	0.7864554	0.67	0.5105

\*\* indicates  $p < .05$

\* indicates  $p < .1$

#### V. Stewardship behaviors

Participants were asked whether there were “things you have done in your everyday life to help the environment?” In the pretest, 70% of students answered positively and 29% answered negatively. In the posttest, 88% of students answered positively and 12% answered negatively. They were then asked to give examples of the type of work they had done. In the post-test, the examples of the types of work they had done usually referenced their work with Trees NY doing inventoring, tree pruning, and maintenance work, though there was also an increase in the respondents that said they do not litter or would pick up trash if they saw it. The table below summarizes the responses.

STEWARDSHIP ACTIVITIES		
	PRETEST	POSTTEST
NO / NOTHING	3	2
Participate in TNY/ care for trees	2	8
Plant or care for flowers	2	2
General change behavior / not specified	1	1
Take care of animals	1	1
Recycle	1	1
Not litter / pick up garbage	1	5
Teach others about enviro	1	1
Learn about enviro	1	1
Save water	0	1
NO RESPONSE	4	1

As a means of establishing a baseline for potential longer term study, participants were also asked in the pre-test only, to indicate whether they never, sometimes, or frequently participated in a variety of stewardship activities including the following (variable names listed in parentheses):

- *Planted a tree (tree)*
- *Been involved in a community garden (garden)*
- *Participated in a park or beach clean-up or volunteer event (park)*
- *Signed an environmental petition (petition)*

- *Been a member of an environmental club or organization (club)*
- *Turn off lights and electrical appliances when not in use (lights)*
- *Recycle things such as newspapers, cans, and glass (or encourage your parents to do so) (recycle)*

Results are presented in the table below, with the most frequent environmentally conscious behaviors being turning out the lights and recycling, both of which are personal responsibility behaviors that can easily be practiced in the household and at school. The least common environmental stewardship behaviors were signing an environmental petition and planting a tree.

STEWARDSHIP ACTIVITIES	TREE	GARDEN	PARK	PETITION	CLUB	LIGHTS	RECYCLE
NEVER	13	11	10	14	6	1	5
NEVER %	72%	61%	59%	82%	35%	6%	29%
SOMETIMES	5	5	7	2	6	8	5
SOMETIMES %	28%	28%	41%	12%	35%	47%	29%
FREQUENTLY	0	2	0	1	5	8	7
FREQUENTLY %	0	11%	0	6%	29%	47%	41%
NO RESPONSE	1	1	2	2	2	2	2
TOTAL RESPONSES	18	18	17	17	17	17	17

Improvement in on-the-job individual and teamwork effectiveness has been previously noted, but does offer evidence of some behavior change. In terms of behaviors *beyond* the program, the NRS research technician cited an example of a student who went home and identified every tree species on her block, as well as noting which trees needed to be pruned.

Finally, emails from participants to the Supervisor offer further evidence of the impact of the program beyond the duration of the work:

*“I miss Trees New York so much....After the program my days were BORING. I had nothing to entertain me and nothing to learn. I taught my family about the different things I learned, and I told all my friends. They think its stupid how I was identifying trees. But they don't know what we know. => So I informed them, and told them the purpose of what it is we do. Anyways, the rest of my summer was pretty boring....I really do miss all the cool things you did with us. I hope you've enjoyed these past two months. I'll definitely keep in touch. Oh, and Anthony, I just want to say thank you again for everything. I really did appreciate this summer. It was a wonderful experience and I hope the program continues so it can inspire other kids the way it did for me. You know I never told anyone this, but the last day we were all together, I almost teared a bit. My eyes definitely got watery though....”*

--Email from participant to supervisor, approximately one month after program ended

This feedback, as well as the observations of the Supervisor and NRS research technician suggest the need for concrete next steps and follow-ups for all of the students at the end of their summer term. The participants have been given an introduction to environmental stewardship work, and continued mentorship and guidance would help them to continue to build on this experience. Resource packets were provided by NRS with information about local programs, internships, and college programs. However, a targeted and immediate next step through either school or work was not made clear – this was left up to student initiative.

## VI. Conclusions and Recommendations

This program offered an opportunity for a two month, in-depth and field based urban forestry work experience for low income and largely minority teenagers in the Bronx. As such, it clearly fits the Trees New York mission of planting, preserving, and caring for New York City's trees. It also supports the Forest Service focus areas of improving ecological literacy and urban natural resources stewardship.

**Awareness:** Participant knowledge of tree species, tree biology, and tree pruning improved across the board. Systems environmental thinking and understanding of urban ecology did not change dramatically, likely due to the tree-focus of the curriculum and work. Following the program, a wider range of green collar jobs were identified by the participants.

**Attitudes:** The evaluation shows that students were, almost uniformly, *already* interested in the outdoors, so the real barriers to youth engagement are not necessarily environmental attitudes. Programs can expect a high degree of interest in being active and physical outside. The pre/post test results do suggest that the experience was able to diminish the perception of dislike and fear related to the outdoors, in terms of perceptions of urban environmental quality as poor and perceptions of dangerous strangers and people outside.

Some of the strongest evidence in the evaluation comes from the pre/post test scores on self-confidence and self-efficacy, all of which increased over the course of the summer. This program gave youth new knowledge, responsibilities, and an interdependent working environment, all of which are conducive to the development of self-confidence. Facing and meeting daily challenges showed participants that their work could turn out well, and that they could impact a visual and physical change on their immediate environment.

**Stewardship Behavior:** Following this program, all of the participants have a greater exposure to environmental stewardship through tree care, which was reflected in the pre/post test findings. Participants also reported that they would be more likely to recycle and less likely to litter, suggesting perhaps the beginning of a personal environmental ethic. Improvement in work ethic and effectiveness on the job, as well as anecdotal evidence of taking environmental learning from the jobsite to the home or peer groups shows that evidence that participants were beginning to increase their stewardship behaviors overall.

### Overall Recommendations:

- Having only one full-time supervisor was a challenge from a staffing perspective and is instructive for the future management of the program. At least two full-time staff members, if not three, are required to manage a group of this size.
- Newer technology including more, faster GPS units and consistent access to sufficient computers will also help improve fieldwork and workflow
- More forethought needs to be given to the structure of the curriculum so that every single student has a meaningful task for the entire duration of the workday. Much of the success rested on experience and improvisation of a temporarily hired project Supervisor, such that successful replication of the program would be challenging.
- While the program was effective in teaching students about tree care and giving them a positive working environment, it did not affect as much of a change in ecological or systems thinking or understanding of the relationship of the forest to the city. Given TNY's emphasis on individual tree care, this is a successful outcome. If the FS hopes to continue to advance a broader curriculum agenda to include more of a focus on the rural to urban gradient or urban ecological systems, additional emphasis will need to be placed in this area.
- Clear next steps and follow-up should be presented to the youth, beyond the resource packets that were provided. A link to a school-year position or other institutions with which they can continue to work would allow a continuity of learning and positive environmental work experiences.

## VII. Appendices

### A. LITERATURE REVIEW

In November 2007-February 2008, Lindsay Campbell conducted a review of the literature on minority and youth attitudes towards and awareness of the environment, the urban environment, and urban environmental careers. Literature related specifically to public housing and urban forestry was also examined. The literature identifies multiple barriers to minority and low-income populations' engagement in environmental issues and environmental careers. Barriers can be thought of in terms of attitudes, awareness, perception, access, and behavior.

A multiplicity of barriers stands in the way of minority engagement in natural resource careers; Kuns et al (2001) found that only 5% of urban forestry/aboriculture professionals in 1996 were minorities and that minority entry into this profession lags behind that of other fields. Indeed, the authors state, "minorities are so poorly represented in urban forestry and forestry in general that almost nothing is known of their experiences and attitudes within these professions" (11). The authors sought to understand what motivates people to engage in urban forestry careers, and found interest and enjoyment to rank higher than income/employment ends; and those with motivations of interest and enjoyment had higher satisfaction on the job. These finding squares with a need to foster meaningful engagement with the environment, not just as an instrumental end but as an end unto itself. In terms of policy recommendations, the authors suggest a need to increase minority exposure to urban forestry careers, particularly through role models, and to increase minority recruitment to natural resource education programs, all of which are approaches taken in this outreach and research project. The suggestion to improve hiring practices is beyond the scope of this project, but is well in concert with it.

The research on environmental attitudes is broad, and spans a range of topics from attitudes on national environmental issues to perceptions of wildlands. A number of studies have attempted to compare attitudes by race, particularly through the use of national surveys. Arp and Kenny (1996) are critical of some of the past work, saying that it misses blacks' core concerns with certain environmental threats at the local scale. This project has an intensely local focus, in terms of the immediate environment that will be used for the hands-on activity. Arp and Kenny (1996) also found that environmental concern was largely independent of age and income, but was positively correlated with education. One of the goals of this project is to foster even greater youth interest in education broadly -- and environmental education in particular. Certain studies have also identified that urban youth care deeply about the environment (Kahn and Friedman 1995; Rockland 1995). Other studies have shown that attitudes are related to wildland preferences, such that youth with higher fear expectancy, disgust sensitivity, and desire for modern comforts will prefer indoor and urban environments to wildland environments (Bixler and Floyd 1997). This is problematic, the authors claim, because "unfortunately, those who are apprehensive of wildlands may find outdoor careers and wildland recreation activities unappealing, landscape their homes in ways that reduce biological diversity (Jenkins 1994; Nassauer 1988, 1992a, 1992b), and miss developmentally important childhood experiences (Hart 1978; Saegart and Hart 1979)" (444).

Moving beyond attitudes and awareness, it is important to focus also on behavior. A full investigation of the link between attitudes and behaviors will be explored further in a literature review for final results. There is a body of theory and empirical research disputing the different relationships and mechanisms linking attitudes and behavior (see, for example Clark, 1992; Jackman and Crane 1981). For one example focused on the subject matter at hand, an article on urban tree planting programs found, "Efforts to increase environmentally sound behaviors and practices have in the past often focused on consciousness-raising and attitude change. Research indicates that such efforts are less effective than interventions designed to make environmentally sound behaviors easier to engage in, or to make personal advantages resulting from such behaviors more clear to individuals" (Summit and Somner 1998, 1). The authors found that participating in hands-on activities such as tree planting led to greater satisfaction with and investment in the life of the tree and made five recommendations for urban forestry projects: "1) Make the desired behavior easy to engage in. 2) Emphasize practical, personal benefits of an environmentally sound behavior; or make an environmental threat relevant to people in a personal way, and give them something to do to counter that threat. 3) Work with community groups or local

residents. 4) Make the desired behavior as social as possible. 5) Make requests personal, rather than general” (Summit and Somner 1998, 4-5). This project attempts to heed this advice with its hands-on activity approach and its focus on jobs, which is a core need and interests for these teens.

Literature related specifically to public housing and urban forestry was also examined. O’Brien (2006) found that urban woodlands and open space near low-to-moderate income subsidized housing in London were used in a variety of ways by different age groups, producing differing perceptions of the benefits and risks of those environments. Safety and security concerns were raised by some residents, which supports the findings of Kuo and Sullivan (2001). However, many of the youth found the woods and the open space adjacent to buildings to be important areas for play, which echoes the findings of Richard Louv (2006) in his work *Last Child in the Woods*. A study of open space and public housing in Chicago found that natural landscaping of grounds encourages greater use of open space by residents; presence of trees encouraged group gatherings; and denser groups of trees attracted denser groups of people (Conley et al 1997). These findings point to the impact of the design of open space on social interaction – and support the importance of the hands-on work in grounds maintenance that the students conducted.

O’Brien (2006) observed that public housing agencies expend more resources on building maintenance and upkeep than they do on landscape, a finding that has been reiterated locally by NYCHA partners as a barrier to cultivating greater engagement with NYCHA lands. The paper also noted the challenge of reaching teens and engaging them with open space, which is precisely the group targeted by this program. Finally, O’Brien draws on multiple methods, including a survey, focus groups, and participant observation of groups during a hands-on activity – an approach that was also used in this program.

Broussard et al (2001) investigated the impacts of environmental education on fostering a stewardship ethic among urban youth, working in three different contexts: the classroom, the park, and the demonstration forest. The first two site types were the most commonly experienced in this project setting, but the authors found that the forest was the most effective learning environment because it allowed students to immerse themselves in the practice and impacts of forestry. This supports the importance of experiences like the trip to Black Rock Forest.

**B. PRETEST**

**Trees New York Participant Questionnaire**

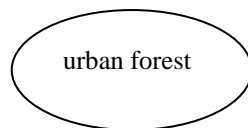
PRINT NAME:

**This is NOT a test – there are no right or wrong answers. The information you give us will help us to better run our program in the future. Do your best to complete each question, but also feel free to say “don’t know” to questions where you aren’t sure.**

1. Please describe the natural resources in your neighborhood. What role do things like parks, gardens, trees, and rivers play in your neighborhood? Or say “don’t know”.
  
2. Please describe the natural resources in New York City. What role do things like parks, gardens, trees, and rivers play citywide? Or say “don’t know”.
  
3. How do forests affect cities? (Positively and/or negatively). Please describe with examples or say “Don’t Know”
  
4. A concept map or web is a diagram showing relationships between the main topic and related ideas, as well as among those related ideas. There are no right answers in concept maps! A student made this example at the beginning of an astronomy workshop.



**Make a concept map or web that illustrates what you know about the urban forest**





5. What are the first 3- 5 words that come to mind when you hear the words “green collar job”?
  
6. Give at least one example of a “green collar job” or say “Don’t know.”
  
7. Do you like being outdoors? What do you like about it? What do you not like about it?
  
8. Identify 1-3 examples of your favorite things to do outdoors.
  
9. Do you find anything challenging or uncomfortable about being outdoors? List 1-3 examples.
  
10. Are there some things you have done in your day-to-day life to try to help the environment? If yes, give some examples of what you have done. If no, why not?
  
11. Now we’ll ask you about some of the things you may have done. For each of the following, indicate whether you never do it, sometimes do it, or frequently do it.

Plant a tree	Never	Sometimes	Frequently
Be involved in a community garden	Never	Sometimes	Frequently
Participate in a park or beach clean-up or volunteer event	Never	Sometimes	Frequently
Sign an environmental petition	Never	Sometimes	Frequently
Participate in a environmental club or organization	Never	Sometimes	Frequently
Turn off lights and electrical appliances at home when not in use	Never	Sometimes	Frequently
Recycle things such as newspapers, cans, and glass (or encourage your parents to do so)	Never	Sometimes	Frequently

12. Finally we'll ask you a few more questions about how you feel about yourself. Read each sentence below. Then think about how much you agree or disagree with each sentence. Circle a number, from zero to ten. "Zero" means you strongly disagree with the sentence. "Ten" means you strongly agree with the sentence. "5" means you do not feel strongly one way or the other – you are neutral about the sentence.

	Strongly disagree					Neutral					Strongly agree				
I feel good about myself	0	1	2	3	4	5	6	7	8	9	10				
I have a lot to be proud of	0	1	2	3	4	5	6	7	8	9	10				
I am a good leader	0	1	2	3	4	5	6	7	8	9	10				
Most things I do turn out well	0	1	2	3	4	5	6	7	8	9	10				
I am happy with the way I can do most things.	0	1	2	3	4	5	6	7	8	9	10				
I can make a difference in the world on my own.	0	1	2	3	4	5	6	7	8	9	10				
I can make a difference in my community on my own.	0	1	2	3	4	5	6	7	8	9	10				

You are done! Thanks for participating.  
Please give your questionnaire to Anthony.

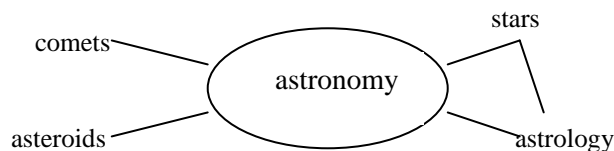
**C. POST-TEST**

**Trees New York Participant Questionnaire**

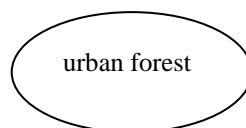
PRINT NAME: \_\_\_\_\_

**This is NOT a test – there are no right or wrong answers. The information you give us will help us to better run our program in the future. Do your best to complete each question, but also feel free to say “don’t know” to questions where you aren’t sure.**

1. Please describe the natural resources in your neighborhood. What role do things like parks, gardens, trees, and rivers play in your neighborhood? Or say “don’t know”.
2. Please describe the natural resources in New York City. What role do things like parks, gardens, trees, and rivers play citywide? Or say “don’t know”.
3. How do forests affect cities? (Positively and/or negatively). Please describe with examples or say “Don’t Know”
4. A concept map or web is a diagram showing relationships between the main topic and related ideas, as well as among those related ideas. There are no right answers in concept maps! A student made this example at the beginning of an astronomy workshop.



**Make a concept map or web that illustrates what you know about the urban forest**





11. Next we'll ask you a few more questions about how you feel about yourself. Read each sentence below. Then think about how much you agree or disagree with each sentence. Circle a number, from zero to ten. "Zero" means you strongly disagree with the sentence. "Ten" means you strongly agree with the sentence. "5" means you do not feel strongly one way or the other – you are neutral about the sentence.

	Strongly Disagree					Neutral					Strongly Agree				
I feel good about myself	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I have a lot to be proud of	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I am a good leader	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Most things I do turn out well	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I am happy with the way I can do most things.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I can make a difference in the world on my own.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
I can make a difference in my community on my own.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

12. Would you recommend the Bronx Youth Urban Forestry Empowerment Program to others?

NO  YES

*Why or why not?*

13. Please grade the following:

- a. Your overall summer internship experience A B C D F
- b. Your internship supervisor A B C D F
- c. Mentoring received by your supervisor or other FS employees A B C D F
- d. Services and resources provided by Trees New York A B C D F
- e. Your work environment (e.g. to what extent was it professional, respectful, positive/negative, did you feel like being part of team, were you able to make a contribution, etc.) A B C D F

*Briefly explain why you gave the grades you did. As part of your response, please also tell us how we can improve!*

Finally, we'll ask you some background questions about yourself:

14. What year were you born? YEAR: \_\_\_\_\_

15. Your Gender:  FEMALE  MALE

16. What language(s) do you primarily speak at home?

English

Other, *language*: \_\_\_\_\_

17. Your Ethnic/Racial Group:

American Indian or Alaska Native

Hispanic or Latino American Native

Asian

Native Hawaiian or Other Pacific Islander

Black or African

Multiracial

Caucasian

Other, specify: \_\_\_\_\_

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**ARE YOU WILLING TO PROVIDE MORE INFORMATION?**

We may want to learn more about the responses provided by interns or follow-up with you some time in the future to learn more about how to improve our internships. Would you be willing to speak to us?

NO

YES

Best contact way to contact you: \_\_\_\_\_

\_\_\_\_\_

You are done! Thanks for participating.  
Please give your questionnaire to Anthony.

### **C. PUBLIC ESSAYS**

1. What are your goals for participating in the program? What did you like about your first week of participating in the program? What didn't you like?
2. What is your ideal job? Why? Do you think you'll be able to get this job? Why or why not? What do you think you need to help you get this job?
3. Do you worry about problems with the environment? If not, why not, if yes, how so?
4. Do you feel you can make a change in the environment? If not why not? If so, how? Whose responsibility is it to take care of the environment?
5. This week, did your opinions changes about trees, forests, and the environment? How? If they didn't change, why not?
6. Did this program help you meet any of your goals? Why or why not? What might you do differently with regard to the environment as a result of participating this program – if nothing, why not?