*EarthCorps & University of Washington*

# Trees and Positive Youth Development: Research on Effects of Urban Forestry Work Experiences on Inner City, Underserved Adolescents

## *Report of Research Outcomes*

**Research sponsored by:**

**USDA Forest Service, Pacific Northwest Region**
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U.S. Forest Service, Pacific Northwest Region,
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## ABSTRACT

Many organizations provide opportunities for youth to help steward forests and open spaces in urban settings. Program leaders have observed positive changes and response in young people as they work to care for the natural resources of their communities. Such anecdotes were the inspiration for a program of research. While other social science studies have addressed issues of environmental concern and literacy, this research program attempted to evaluate the psychological dynamics of youth and nature stewardship. Generally, psychological models of youth have been largely problem-centered; adolescence has been viewed as a period fraught with hazards. The concept of positive development has recently emerged, and focuses on individual traits and formative experiences that improve quality of life and bring forth capable people. Supporters of Positive Youth Development create programs that help adolescents become healthy, effective, and productive members of society. Such programs often include outcomes measures and benefits assessment. There is a notable absence in these efforts – knowledge about the potential beneficial affects of urban forest and city green experiences. Numerous studies have evaluated outcomes of wilderness programs, finding developmental benefits for participants. But his report presents a series of studies that have evaluated urban underserved youth who participate in urban forestry projects. The research goal was to quantitatively measure youth affects of personal and social development, increased ability in civic affairs and community dynamics, employability and career interests, and eco-literacy. The outcomes were unexpected, but raise important questions as our society prepares to provide more possibilities for "kids in the woods."

## ACKNOWLEDGEMENTS

This project was supported by: 1) the USDA Forest Service (04-DG-11062764-058) on recommendation of the National Urban and Community Forestry Advisory Council, 2) EarthCorps staff and interns, and 3) the College of Forest Resources, University of Washington. Additional information about the project and related research can be found at: www.cfr.washington.edu/research.envmind/. Appreciation is extended to Ariana Cantu and Heather King as well as EarthCorps interns who managed data collection during the summers of 2005 and 2006.

# EXECUTIVE SUMMARY

Activity and service work in urban forests can provide children and youth with opportunities to interact with nature and the unique ecology of the Pacific Northwest. A recent book makes the case for saving children from Nature-Deficit Disorder (Louv 2005). Studies from the past three decades point to positive affects of nature experiences. Though fewer in number, the most recent studies have explored urban nature outcomes, as compared to wilderness trips and therapy. They tell us that both passive views of nature and active encounters with landscape generate benefits for young people. Urban forests provide rich settings for future exploration and research about the beneficial interactions of youth and urban nature.

A recent study conducted jointly by EarthCorps and the University of Washington used multiple phases of research to evaluate the developmental benefits associated with service work in urban forest restoration.[1] When evaluated at the close of a service work program youth reported little change in self concept, leadership skills, environmental concern, and other developmental traits. However, in another phase of the research, reports from resource professionals who had experienced some time delay between their program experiences and the survey showed positive developmental changes. It may be that young people need time, reflection, and follow-up activity in order to recognize and assimilate the positive influences of a nature service or work program.

**Study Background**
Several domains of prior research were considered in the youth research.

**Nature and positive psychological development**
Positive psychology is an emergent and rapidly developing field of social science (Snyder and Lopez 2002). Most research on youth development during the 20th century focused on abnormal and dysfunctional behavior, yet only 20 to 25 percent of adolescents exhibit serious problems. Positive psychology affirms that most young people are not troubled, yet may need help and suitable environments to attain their greatest personal potential.

Nature experiences provide profound and sometimes unexpected benefits for youth. Recent studies hint at the importance of nearby nature in cities. A series of studies were conducted by the University of Illinois to test the affects of nature contact on young people in inner city settings. Attention Deficit Disorder symptoms are relieved in children after spending prescribed amounts of time in green spaces. The greener the setting, the more the relief. By comparison, activities indoors such as watching TV, or outdoors in paved, non- green areas leave ADD children functioning worse (Taylor et al. 2001).

A second study showed positive relationships between girls and greenery. Girls with home views of nature score higher on tests of concentration and self-discipline, and score lower on tests of impulsivity. Boys displayed no detectable relationship between nature near home and the forms of self-discipline tested (Taylor et al. 2002).

[1] full report available at http://www.cfr.washington.edu/research.envmind/civic.html

### Service learning benefits

A recent survey conducted on behalf of the National Youth Leadership Council, reports that service-learning has a strong impact on the youth-adult transition (Kielsmeier et al. 2006). The study examined service-learning's potential to ease adolescent transition to adulthood, and showed its positive benefits. The data show that U.S. adults who engaged in service-learning during their school years were more likely than the rest of their peers to:

- Be politically and socially connected to their communities
- Serve as role models for young adults
- Understand the importance of lifelong learning
- Attain a higher level of education
- Engage in service

Data were obtained across a variety of service-learning situations, so it is uncertain as to how nature-based experiences may compare within these findings. Positive possibilities can be tested with future research.

### Urban nature stewardship – the potential

Positive Youth Development (PYD) programs have rapidly emerged in many U.S. cities to help youth become healthy, effective, and productive members of society. Recent studies and resulting publications provide guidance for positive development of urban youth (Eccles and Gootman 2002).

There is a notable absence in the development and program literatures – studies of the affects of city green and urban forest experiences. We know much about therapeutic affects of wilderness experience. Studies on youth benefits of wilderness and outdoor adventure programs note that there are numerous positive affects, with improvements demonstrated in academic performance, leadership traits, self-concept, personality development, interpersonal skills and adventuresomeness (Hattie et al. 1997).

Thousands of urban youth participate in urban forestry and urban greening projects in cities throughout the U.S. Yet little is known about either the short term or long term affects of such experiences on a group of people who represent the future of our nation. There has been relatively little study about outcomes of youth and urban landscape experiences. Program leaders tell many inspiring stories of individual learning and growth. Such benefits are generally assumed to occur by the organizations or agencies that sponsor youth and urban resources programs.

Few, if any, studies have directly measured the therapeutic or developmental benefits for inner-city youth of urban forestry project experience. Research is needed to systematically quantify outcomes, so that affects are better understood and programs can be conducted in ways that best serve their youth participants.

### Stewardship and career choice

Positive development and connections to nature have substantial consequences for individuals and for society. Committed and knowledgeable professionals are needed if the city, state and nation are to successfully move to sustainability. Career choice is rarely an abrupt decision, nor

the outcome of a momentary, unique opportunity. For many people, a career is the outcome of a sequence of interests, influences, and educational experiences. Other science-based professions, such as engineering and medicine, have pursued the issue of career choice extensively, finding that choices about majors during postsecondary education and career are formulated by early socialization and behaviors that emerge in the adolescent years (Leslie et al. 1998). The most significant influences leading to career choice in natural resources are experiences of natural areas, parental influences and organizations (Chawla 1999). Urban forest stewardship programs could be part of an important "life sequence" to career choice.

**Conceptual Approach**

The project was a series of human dimensions explorations, guided by concerns about adolescent youth and urban nature. In each of the research phases careful attention was given to use of conceptual and theoretical principles of youth development from the social sciences. While the direct purpose of this research was to evaluate youth in theirs tewardship activity, a broader purpose was to contribute to better understanding of youth development.

Advances in a field are best achieved by measures constructs that address the full scope of the phenomena of interest, and are rooted in theories that specify their sources, mediating processes, and multiple effects. Theory-based constructs generate results that can enhance understanding, and provide helpful guidance for program development.

Many youth and nature programs have conducted evaluations, and many have used one-time, ad hoc measures, developed to reflect the unique circumstances of a particular program. In order to gain the attention of the professionals who work with youth an effort was made to address youth and nature benefits that are associated with broader theories and constructs of youth development.

Many programs aim to aid youth in order to achieve positive development and personal fulfillment. Content and activities include computer technology labs, community art, sports teams, and activity-based organizations, such as 4-H and Girl or Boy Scouts. For each of these there are major constructs that transcend the literal activities (Stukas et al. 1999). Adolescents who participate in youth programs may show gains in three major domains; each was explored in this research:

- Self-Enhancement (self-esteem, personal efficacy, and confidence)
- Understanding of Self and World (personal growth, development of moral reasoning, empathic understanding, and attitudes toward diverse groups in society)
- Value-Expression (expression of humanitarian and prosocial values through action and plans for future involvement in community service)

**Research Program**

This report describes a research effort to better understand the potential developmental benefits for youth of urban nature stewardship activities. Non-profit organizations (NPOs), government agencies and social scientists partnered to do the research. The project was based in the Pacific Northwest, but the intent of the project was to address human populations and youth program situations that are typical throughout the United States. This was done in two ways. First, youth oriented urban greening programs from across the U.S. were included in the project. Also, the

project was conducted in several phases, using a comprehensive program of qualitative and quantitative methods to measure youth benefits and positive development. Measures that have been developed in both environmental psychology and "mainstream" youth psychology were used (Hoge 1999). Measurement techniques that have been tested for reliability and validity were used whenever possible.

The U.S. census projects that by the year 2050 minority peoples will make up half of the nation's population. Asian and Hispanic populations are expected to triple. The minority youth of today will become the community leaders of tomorrow. This project particularly focused on young people of color.

The research was conducted primarily by two collaborators. EarthCorps is a non-profit organization, with the mission to build global community through local environmental service. EarthCorps was the lead in research implementation, using staff to conduct the field procedures. Dr. Kathleen Wolf of the University of Washington was the science collaborator, and prepared the data collection instruments, analyzed data, and drafted research findings. Both collaborators are conducting outreach and technology transfer.

Four project activities are reported in the sections that follow.

**Literature Review**: The first activity was an extensive literature review that addressed two topics. Of primary interest for the entire research program was the affect of nature experience on self-development in youth, thus a review of youth development and benefit studies was done. The review assessed the science of abnormal youth psychology, positive youth psychology, and youth benefits from wilderness therapy and outdoor adventure experiences (such as Outward Bound). Another interest was the role of adolescent nature experiences on adult career interests. Studies about precursors and influences on science and natural resource choices were reviewed. Findings are integrated within the three research sections. Literature reports are condensed; full literature reviews are found in appendices.

**Professional and Youth Interviews**: Data collection started with two sets of interviews in Spring 2005. Urban youth, of underserved communities within Pacific Northwest cities, and ranging in age from 12 to 21 years, were interviewed to determine the scope and perceptions of their experiences with urban forestry work. Twenty six youth participated in interviews. Also, to understand career choice and long term personal development implications, interviews were conducted with minority resource professionals about their adolescent nature experiences. Twenty seven professionals from around the U.S. participated in 30 to 60 minute interviews. The interviews were intended to provide preliminary insights on both near and long term outcomes of urban youth and nature work experiences. Interview results, reported in Section 2, were integrated with the literature review to become the foundation for later quantitative evaluations.

**Youth Field Surveys:** In the second phase of data collection, described in Section 3, standardized instruments were constructed and pre-tested. These instruments are similar to those used in other scientifically respected youth evaluations, but applied in a new context. The

measures surveys were administered as pre and post-tests to 119 youth participating in eight youth programs in major cities in the United States in summer 2005.

**Second Youth Field Surveys:** Though not intended at the beginning of the project, a second phase of survey work was done (reported in Section 4), as the results of Phase II came as a surprise to both program and science partners. A modified version of the survey procedures were repeated in summer 2006 with youth in the Seattle area, and included reflection exercises.

**What Did We Learn?**

**Looking back**

One research purpose was to learn about the affect of youth in urban resource programs and career choice. Under-representation of women and minorities in urban forestry and natural resources careers is a problem of national concern. We explored the affects of youth nature experiences for adult professionals who now work in natural resources (with a focus on women and minority individuals).

Due to the research design it is impossible to make conclusions about the causal relationships of youth nature-based experiences and later career choice. Yet certain insights emerged from the exploratory interviews with resource professionals and youth who have recently completed a stewardship program.

First, professionals' responses suggest the importance of ongoing, multiple nature experiences through adolescence, rather than a single encounter. The remembered experiences are quite varied, including a combination of sensory, emotional, cognitive and behavioral modeling influences.

Second, it seems that influential experiences are more formal in structure and content, provided guided learning and competence in an environmental endeavor. Learning combined with achievement was fondly remembered. Key adults served as mentors and experience guides. Social dynamics with peers were quite important in the memories of youth and adults. Interestingly, youth focused on social aspects of their recent programs, with fewer reports of the value of learning. Are future professionals those who pursue and enjoy learning opportunity more within a short-term program? Or were programs of the past more oriented to education as compared to today's field task programs?

Some people can recall a pivotal experience that shaped who they chose to become. But our data show that a single service project during adolescence may not be enough to prompt a sense of life commitment. Rather, multiple and diverse experiences, in total, may become a valued and insightful base for later career decisions.

**What Do We Do Now?**

Surveys were administered as pre and post tests, and based on anecdotal reports from program leaders across the country; some level of change in self development was expected. Surveys included measures for these developmental concepts:

- Self-Concept

- Self Efficacy
- Environmental Identity
- Environmental Concern
- Civic Engagement

Pre and post test results are shown in Figure 1.Why was little change detected? The range of scores on these measures was well within the means from prior studies. Youth who were developmentally "stable" may have self-selected to participate in the programs, or may have chosen to participate because they already had a commitment to environmental stewardship. It may be that despite the stereotypes about volatile teens, core developmental traits are remarkably resilient, and it takes more than a few week long program to induce change of self.

Nonetheless, interviews with professionals indicated that youth experiences were considered significant. There are many mediating conditions that could explain the differences between outlooks: maturity, career success providing positive developmental feedback, or again, self-selection. Only a long-term longitudinal study could tease out the causal factors.

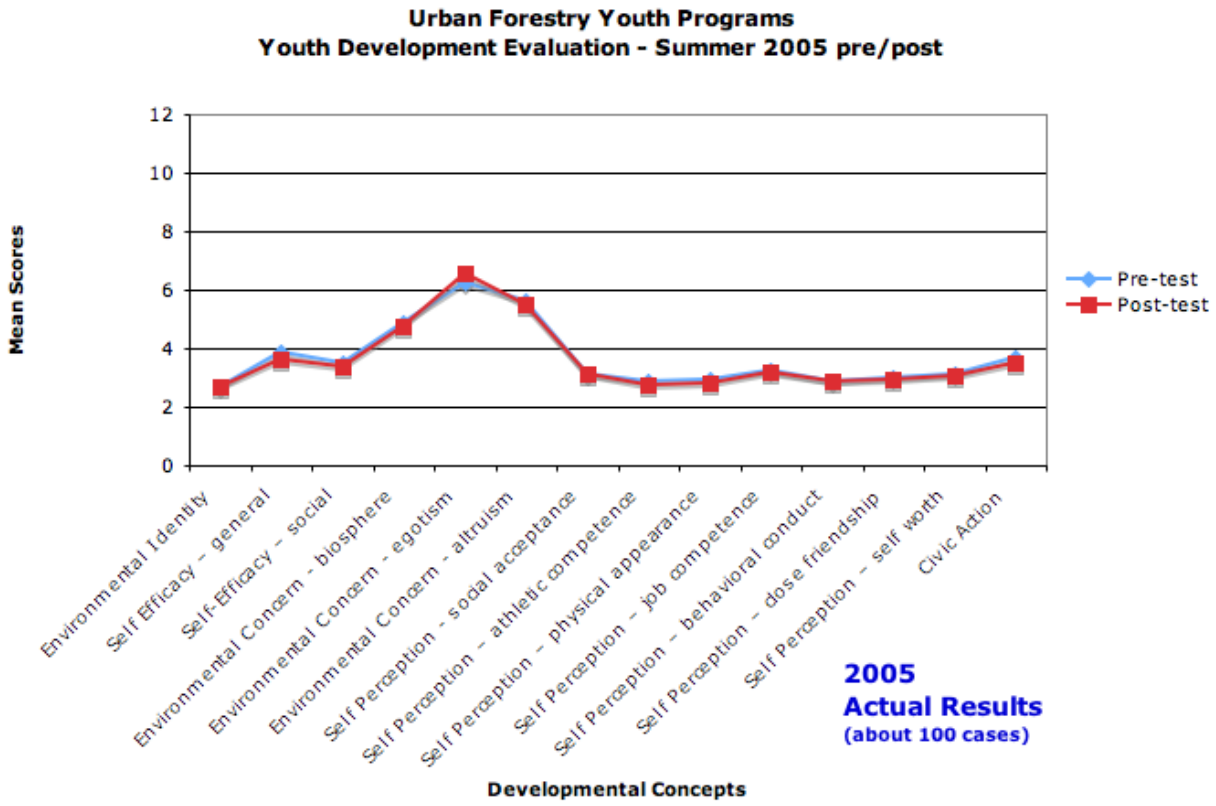


**Figure 1: Results of youth development surveys**

The professionals as young people enjoyed a series of nature experiences that were of divergent character and purpose. Rather than focusing on a solitary program experience, program planners may need to form coalitions of organizations that comprehensively design and provide a lifecycle progression and range of outdoor nature experiences. Perhaps a "nature curriculum" is a pre-school to college range of experiences that respond to the developmental pathways of youth. And to focus on career choice, results suggest that experiences in late high school may shape career interest more directly.

Just as there is now recognition of multiple intelligences (Gardner 2006), so might there be multiple pathways to nurturing and encouraging greater connectedness to nature as a person transitions from childhood to being an adult. How might the nature programs we studied be "bundled" with other programs to offer a sequence of nature encounters? Despite the limitations of these findings and the narrowness of this sample of adolescents, the results indicate we need better understanding of the role of urban nature-based programs in positive youth development.

The survey testing was an effort to see the "real time" influences of nature stewardship work on youth development, but revealed little change in self. Meanwhile the interview results speak to how programs are developed and offered to youth, and how they might reveal and nurture interest in natural resources, including later career choice. The importance of multiple programs suggests that organizations should take a broader view of their programs to assess their own program within a context of multiple age and activity focused experiences across the teen years. Can the range of experience needed to nurture nature in youth be provided by a single organization? Probably not. A regional coalition of organizations that offer an interlinked series of programs, including mentored learning, may more effectively reach and benefit young people.

# 1. INTRODUCTION

Many studies describe the benefits that urban people gain from experiences of nearby trees and nature. Particular benefits have been identified for youth, such as social development and reduction of ADHD symptoms (Kuo 2003). Thousands of urban youth participate in urban forestry and urban greening projects in cities throughout the U.S. Yet little is known about either the short term or long term affects of such experiences on the people who are the future of our nation.

Positive psychology is an emergent and rapidly developing field of social science (Snyder and Lopez 2002). Most research on youth development during the 20th century focused on abnormal and dysfunctional behavior, yet only 20 to 25 percent of adolescents exhibit serious problems. Positive psychology affirms that most young people are not troubled, yet may need help to attain their greatest personal potential.[2]

Positive Youth Development (PYD) programs have rapidly emerged in many U.S. cities to help youth become healthy, effective, and productive members of society. Recent studies and resulting publications provide guidance for positive development of urban youth (Eccles and Gootman 2002).

There is a notable absence in the development and program literatures; there have been few studies of the affects of city green and urban forest experiences. We know much about therapeutic affects of wilderness experience. Studies on youth benefits of wilderness and outdoor adventure programs note that there are numerous positive affects, with improvements demonstrated in academic performance, leadership traits, self-concept, personality development, interpersonal skills and adventuresomeness (Hattie et al. 1997).

We know little about the outcomes of youth and urban resource stewardship from an empirical perspective. Do developmental benefits occur in urban programs? Program leaders tell inspiring stories of individual learning and growth. Such benefits are generally assumed to occur by the organizations or agencies that sponsor youth and urban resources programs. Few, if any, studies have directly measured the therapeutic or developmental benefits for inner-city youth of urban forestry experiences. Research is needed to systematically quantify outcomes, so that affects are better understood and programs can be conducted in ways that best serve their youth participants. The research projects describe here were an effort to fill the gap.

## 1.1. Conceptual Approach

While the direct intention of this research was to evaluate youth and their participation, a broader purpose was to contribute to better understanding of youth development. The project, a series of social science studies, was guided by questions about adolescent youth and urban nature. Many youth and nature programs have conducted evaluations, and many have used one-time, ad hoc measures, developed to reflect the unique circumstances of a particular program. In order to gain the attention of the professionals who work with youth an effort was made to address youth and nature benefits that are associated with broader theories and constructs of youth development.

In each of the research phases careful attention was given to use of conceptual and theoretical principles of youth development from the social sciences. Advances in a field are best achieved by measures constructs that address the full scope of the phenomena of interest and are

[2] Additional literature concerning Positive Youth Development is presented in Appendix A.

rooted in theories that specify their sources, mediating processes, and multiple effects. Theory-based constructs generate results that can enhance understanding, and provide helpful guidance for program development.

There are many programs aimed at aiding youth to achieve positive development and personal fulfillment. Content and activities include computer technology labs, community art, sports teams and activity-based organizations, such as 4-H and Girl or Boy Scouts. There are major constructs that transcend the literal activities (Stukas et al. 1999). Adolescents who participate in youth programs may show gains in three major domains; each was explored in this research:

- Self-Enhancement (self-esteem, personal efficacy, and confidence),
- Understanding of Self and World (personal growth, development of moral reasoning, empathic understanding, and attitudes toward diverse groups in society), and
- Value-Expression (expression of humanitarian and pro-social values through action and plans for future involvement in community service).

### 1.2. Research Program

Non-profit organizations (NPOs), government agencies and social scientists partnered to do the research. The project was based in the Pacific Northwest, but the intent of the project was to address human populations and youth program situations that are typical throughout the United States. This was done in two ways. First, youth oriented urban greening programs from across the U.S. were included in the project. Also, the project was conducted in several phases, using a comprehensive program of qualitative and quantitative methods to measure youth benefits and positive development. Measures that have been originate in both environmental psychology and "mainstream" youth psychology were used (Hoge 1999). Measurement techniques that have been tested for reliability and validity were used whenever possible.

The U.S. census projects that by the year 2050 minority peoples will make up half of the nation's population. Asian and Hispanic populations are expected to triple. The minority youth of today will become the community leaders of tomorrow. This project particularly focused on people of color.

The research was conducted by two primary collaborators. EarthCorps is a non-profit organization whose mission is to build global community through local environmental service. EarthCorps was the lead in research implementation, using staff to conduct the field procedures. Dr. Kathleen Wolf of the University of Washington was the science collaborator, and prepared the data collection instruments, analyzed data, and drafted research findings. Both collaborators are conducting outreach and technology transfer.

### 1.3. Report Contents

Four project activities are reported here:

#### Literature Review

The first activity was an extensive literature review that addressed two topics. Of primary interest was the affect of nature experience on self-development in youth, thus a review of youth development and benefit studies was done. The review assessed the science of abnormal youth psychology, positive youth psychology, and youth benefits from wilderness therapy and outdoor

adventure experiences (such as Outward Bound). Another interest was the role of adolescent nature experiences on adult career interests. Studies about precursors and influences on science and natural resource choices were reviewed. Findings are integrated within the three research sections. Literature reports are condensed within the main report; full literature reviews are found in appendices.

**Phase I: Professional and Youth Interviews**

Initial data collection included two sets of interviews in Spring 2005. Urban youth, of underserved communities within Pacific Northwest cities, and ranging in age from 14 to 18 years old, were interviewed to determine the scope and perceptions of their experiences with urban forestry work. Also, in order to understand long-term career choice and personal development implications, interviews were conducted with 27 minority resource professionals about their adolescent nature experiences. The interviews were intended to provide preliminary insights. Interview results, reported in Section 2 were integrated with the literature review to become the foundation for later quantitative evaluations.

**Phase II: Youth Field Surveys**

In the second round of data collection, described in Section 3, standardized instruments were constructed and pre-tested. These instruments are similar to those used in other scientifically regarded youth evaluations, but applied in a new context. The measures surveys were organized by developmental theories. They were administered as pre- and post tests across youth programs in major cities in the United States in Summer 2005.

**Phase III: Second Youth Field Surveys**

Though not intended at the beginning of the project, a second phase of survey work was done and is reported in Section 4. The results of Phase II came as a surprise. A modified version of the survey procedures were repeated in summer 2006.

# 2. YOUTH AND PROFESSIONAL INTERVIEWS

## 2.1 Background Information

One potential affect of youth participation in urban resource programs is job and career choice. Under-representation of women and minorities in urban forestry and natural resources careers is a problem of national concern. Women and minorities are well established in many professions in the United States, holding entry-level to upper management positions. However, entry and advancement of females and minorities in natural resource professions is thought by many to be lagging behind what is needed (Otero and Brown 1996).

Social equity and the quality of regional and municipal resource programs are concerns (Kuhns et al. 2004). Urban forestry professionals might better represent their diverse clientele if they, as a group, were similarly diverse. In addition, urban forestry can certainly benefit from the diverse skills and outlooks of women and minorities, and from having a larger pool of potential employees in tight labor markets.

Given the current low levels of women and minorities employment in the profession, the benefits of their participation are not being realized. In 1996, the U.S. civilian labor force was 46% female and 15% minority (U.S. Census Bureau 1998); representation of these groups in urban forestry positions was estimated at 9.7% female and 5.3% minority at the same time period (Kuhns et al. 2002).

Underutilization of women and minorities in science and engineering has been a recurring topic of science policy research, and a substantial literature has been published about the topic (Leslie et al. 1998). A more complete literature background on these topics, including career choices in natural resources, is in Appendix B.

The urban forestry and arboriculture professions might provide different and more attractive opportunities for women and minorities than traditional forestry professions in general (Hildebrandt et al. 1993) and in particular might be attractive to minorities in urban areas (Wright and Floyd 1990). This study is a preliminary effort to assess the experiences and conditions that may contribute to career choices in urban forestry and natural resources, as the literature on urban forestry and natural resource career choice is sparse.

There are several ways that associations between adolescent dynamics and career choice could be influenced and analyzed. One could administer annual surveys or interviews to large populations of youth throughout their teenage years and then conduct exploratory analyses of associations between traits and career choice outcomes (such as Leslie et al. 1998). Or investigators could strategically administer interventions (such as workshops, internships or service learning opportunities) during the teenage years of a group of youth and conduct career choice assessments for multiple years following the activities (such as Bowman and Shepard 1985).

Fiscal and time limitations often make both approaches difficult. This study attempted to discover latent associations following youth participation in urban forestry stewardship programs and traits of professionals. Self-report surveys and interviews were used to probe childhood and adult experiences and outcomes (such as Chawla 1999). A set of contextual and developmental concepts was explored using interviews and on-line surveys of both urban youth and resource professionals. Many confounds and moderating influences make interpretations of causal relationships difficult. This study was intended to explore potential facets of urban resources career choice, and to initiate more in-depth discussion about nature program development.

## 2.2. Methods and Procedures

The first research phase, done in Spring 2005, was exploratory and based on the general research question, "Are there precursors within youth experiences that might indicate an adult career choice in natural resources?" Two data collection approaches were used. First, interviews were conducted with urban forestry professionals located throughout the United States. Second, youth who had recently participated in nature programs in the Seattle (Washington) metro area were contacted and interviewed. Both sets of respondents were asked to complete a survey following their interviews. Questions probed for possible associations between the personal traits of professionals and youth who have participated in urban resource stewardship programs.

The interviews and surveys were designed around several developmental constructs (based on theoretical background found in Appendix C).

- environmental concern
- environmental identity
- self efficacy
- civic engagement
- significant life experiences
- nature activity background

Youth of underserved communities and traditionally underrepresented professionals (e.g. women, people of color) were targeted. Interview participants were identified using opportunistic, snowball sampling. A pool of professional candidates was identified by putting out a request to national urban forestry networks (such as state and federal program coordinators), asking for names from key individuals (such as national non-profit organization, or NPO, directors), and noting additional recommendations as interviews proceeded. The student pool was constructed by contacting agencies, organizations and NPOs in the region who have summer youth programs. Recommenders were asked for names of young people who seemed to have had particularly positive program experiences. Names were provided by program leaders, and additional recommendations by youth who were contacted.

EarthCorps staff interviewed and surveyed 31 professionals in the field of urban forestry throughout the United States, most having multiple environmental experiences in urban and rural setting when between the ages of 13 and 17. Of the professionals interviewed, 20 were females of Caucasian, Latina, Asian and African descent, 11 were males of Asian, Latino, or African descent. The overwhelming majority of the professional's environmental experiences as youth were done as volunteers.

EarthCorps staff also interviewed 26 youth between the ages of 12 to 21 who had been involved in summer environmental programs in Seattle. Youth completed parent consent and individual assent forms before participating (sample forms in Appendices E and F). Youth respondents completed a pencil-and-paper version of the survey. Of 26 youth surveyed, 23 spent their environmental experiences as volunteers. Due to lack of information, we do not have gender nor ethnicity tallies for the youth.

Interview and survey protocols for youth and professionals are found in Appendices G, H, I, and J. Interviews took 30 to 60 minutes; on-line surveys took about 30 minutes to complete.

## 2.3. Results

Interview and survey data was collected for each of the professional and student cohorts. All interview responses were transcribed, content analysis was done, and responses were tallied across themes. Note that in the results reporting percent totals may exceed 100 percent as respondents provided multiple answers. Statistical analysis was done for survey responses. Within and between group comparisons were made. Details of the results are presented.

A limitation of these methods and results, of course, is that the reported answers are provided at only one point in time. Longitudinal or panel studies have been difficult to do in the field of youth and nature programs, due to limited research budgets, and the post-program dispersal of participants. Therefore all interpretations of relationships, be they qualitative or statistical, are correlations and do not represent long term repeated measures.

### Demographics of Youth and Professionals

A secondary focus of this project was the impact of nature-based experiences on minority and underserved populations. In all phases sampling methods were intended to access such populations. Obstacles to this approach included the low cultural diversity in natural resources professions, and lack of any organized networks by which to recruit individuals. Due to limited sampling opportunity the term minority was defined very broadly to include non-white and/or female individuals. Specifics of demographic distribution are as follows.[3]

About 38 percent of professional respondents were white/Caucasian, with others reporting a variety of cultural backgrounds, with African American being the largest non-white representation (27 percent). Women made up 69 percent of the group. Respondent age ranged from 26 to 62, with 19 percent being 40 or younger, 54 percent in their 40s, and 27 percent at 50 or older. Professionals reported being employed in environmental work from 2 to 27 years, with 27 percent at 10 years or less, and 50 percent reporting 20 years or more. State and federal government was the primary employer at 46 percent, followed by 27 percent local government, and some representation of education, non-profit and private sector employers.

All youth were urban residents, with 48 percent of white/Caucasian ethnic background. Other origins were quite diverse, with 26 percent representing multiple Asian cultures, and 16 percent reporting multi-racial heritage. Females made up 58 percent of the group. Age was fairly evenly dispersed from ages 14 to 18.

### Interviews

Table 1 lists content analysis results and tallies for youth and professional interviews. Several questions were posed to both respondent groups; comparison tallies are presented. Results are described in three segments.

*Experience Context* – The shared experience base for youth, through respondent selection, was a summer urban natural resources program. Professionals recalled experiences occurring from junior high through high school, with the most recollections from the late high school period (70 percent). The location of recalled experiences spanned the landscape gradient from urban through suburban and rural areas, to wildland settings. The highest incidence was in urban areas (59 percent) and rural or small town settings (52 percent).

The sources of remembered programs or experiences was wide ranging and included a number of sponsors that were mentioned with almost equal emphasis – family and parents,

[3] Expressed as percentages: n=26 for professionals, n=31 for youth

## Table 1: Content Analysis of Youth and Professionals Interviews

**Pro Q1.1 - Youth nature experience for pros?**

| Created Group/ Volunteer | No Formal | Family & Parents | School/ Church | Summer Job | One Time Formal | Ongoing Org (Scouts, 4H) | |
|---|---|---|---|---|---|---|---|
| 5 | 6 | 8 | 10 | 10 | 11 | 14 | Tallies - Professional |
| 15.2% | 18.2% | 24.2% | 30.3% | 30.3% | 33.3% | 42.4% | %s (33) |

**Pro Q1.3. Where did the experience happen - was it in the city, a rural area or a wildland area?**

| Urban | Suburb/ Residential | Rural/ Small Town | Wildland | |
|---|---|---|---|---|
| 16 | 3 | 14 | 10 | Tallies - Professional |
| 59.3% | 11.1% | 51.9% | 37.0% | %s (27) |

**Pro Q1.4-How old were you?**

| Jr. High | Early HS | Late HS | All HS | Jr. thru HS | |
|---|---|---|---|---|---|
| 6 | 8 | 19 | 1 | 6 | Tallies - Professional |
| 22.2% | 29.6% | 70.4% | 3.7% | 22.2% | %s (27) |

**ProYth Q2 - Main Activities Pro & Youth**

| Vegetation/Ecosystem Enhance ments | Structures & Construc tion | Litter and Clean Up | Urban Greening & Horticulture | Nature Reflection/ Appre ciation | Informal Experi ences | Leadership Experience | Agricultural Education | Unique Program Experience | Outdoor Recreation | Structured Education | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 4 | 0 | 4 | 2 | 3 | 6 | 6 | 7 | 8 | 14 | |
| 42.3% | 15.4% | 0.0% | 15.4% | 7.7% | 11.5% | 23.1% | 23.1% | 26.9% | 30.8% | 53.8% | %s (26) |
| 22 | 13 | 5 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 3 | |
| 84.6% | 50.0% | 19.2% | 11.5% | 0.0% | 0.0% | 3.8% | 0.0% | 0.0% | 3.8% | 11.5% | %s (26) |
| -42.3% | -34.6% | -19.2% | 3.8% | 7.7% | 11.5% | 19.2% | 23.1% | 26.9% | 26.9% | 42.3% | % difference |

**ProYth Q3-Activities Enjoyed**

| Social Dynamics | Environmental Stewardship | Skills, Competence & Achievement | Unstructured Experiences | Satisfying Physical Activity | Leadership & Engagement | Sensory & Aesthetic Experience | Science & Natural History Learning | |
|---|---|---|---|---|---|---|---|---|
| 3 | 3 | 9 | 2 | 7 | 4 | 9 | 12 | Tallies - Professional |
| 11.1% | 11.1% | 33.3% | 7.4% | 25.9% | 14.8% | 33.3% | 44.4% | %s (27) |
| 11 | 6 | 10 | 1 | 5 | 1 | 3 | 2 | Tallies - Youth |
| 42.3% | 23.1% | 38.5% | 3.8% | 19.2% | 3.8% | 11.5% | 7.7% | %s (26) |
| -31.2% | -12.0% | -5.1% | 3.6% | 6.7% | 11.0% | 21.8% | 36.8% | % difference |

**ProYth Q4-Memorable Experiences/Why**

| Stewardship & Giving Back | Outdoor Recreation & Physical Activity | Personal Development | Social Dynamics | Nature Identity & Appreciation | Sense of Achievement | Leadership & Opportunity | Teachers & Mentors | Learning & Discovery | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 5 | 1 | 19 | 6 | 6 | 6 | 10 | 10 | Tallies - Professional |
| 6.9% | 17.2% | 3.4% | 65.5% | 20.7% | 20.7% | 20.7% | 34.5% | 34.5% | %s (29) |
| 4 | 6 | 2 | 15 | 2 | 2 | 2 | 1 | 1 | Tallies - Youth |
| 15.4% | 23.1% | 7.7% | 57.7% | 7.7% | 7.7% | 7.7% | 3.8% | 3.8% | %s (26) |
| -8.5% | -5.8% | -4.2% | 7.8% | 13.0% | 13.0% | 13.0% | 30.6% | 30.6% | % difference |

**Yth Q6-Life Changes**

| Community Awareness | Personal Satisfaction & Benefit | Improve Interpersonal Skills | Expand Social Awareness | Changed Education Interests | Personal Efficacy & Impact | Build Leadership, Engagement & Service | Environmental Awareness & Concern | |
|---|---|---|---|---|---|---|---|---|
| 3 | 4 | 5 | 5 | 7 | 7 | 8 | 11 | Tallies - Youth |
| 11.5% | 15.4% | 19.2% | 19.2% | 26.9% | 26.9% | 30.8% | 42.3% | %s (26) |

**Yth Q7-Nat Res Career Interest**

| Yes | No | Unsure | Public Sector | Private Sector | Volunteer or Community Service | |
|---|---|---|---|---|---|---|
| 9 | 15 | 1 | 4 | 1 | 8 | Tallies - Youth |
| 34.6% | 57.7% | 3.8% | 15.4% | 3.8% | 30.8% | %s (26) |

**Pro Q5a-Career Choice?**

| Yes | No | Delayed Realization | Early Interest in Resources Work | University Interests | Social Component Important | |
|---|---|---|---|---|---|---|
| 23 | 2 | 7 | 12 | 4 | 2 | Tallies - Professional |
| 82.1% | 7.1% | 25.0% | 42.9% | 14.3% | 7.1% | %s (28) |

**Pro Q5b-Experience Attributes and Career Influence**

| Family Dynamics | Revealed Social Concerns | Nature Solace & Joy | Professional Modeling | UF as Unique Professional Niche | Nature Comfort & Affinity | Satisfactions & Aesthetics | Develop Aptitudes, Interests & Abilities | |
|---|---|---|---|---|---|---|---|---|
| 5 | 6 | 7 | 7 | 8 | 10 | 11 | 17 | Tallies - Professional |
| 17.9% | 21.4% | 25.0% | 25.0% | 28.6% | 35.7% | 39.3% | 60.7% | %s (28) |

Notes: exploratory, multiple responses across categories, no tests of association or significance, categories based on interpretive content analysis of transcribed verbal responses

school and church, summer job, a one-time unique experience (such as a biology camp) and a formal organization, such as scouts or 4H (with the highest tally at 42%). Most respondents recalled multiple experiences suggesting that an ongoing range of activities during adolescence is important to later connections to natural resources and perhaps career choice in the field.

*Satisfactions and Meaning* – Several interview questions were intended to explore the content or character of a nature-oriented program that may have influenced attitudes. Similar questions were asked of youth and professionals.

One question asked about the main activities of a program, producing a list of eleven across both groups. Tallies are compared by percentage in Table 2:

**Table 2: Nature Program Activities, Professionals and Youth**

| Main Activity | Pros %s (n=26) | Youth %s (n=26) | % difference |
|---|---|---|---|
| Vegetation/Ecosystem Enhancements | 42% | 85% | **-42%** |
| Structures & Construction | 15% | 50% | **-35%** |
| Litter and Clean Up | 0% | 19% | -19% |
| Urban Greening & Horticulture | 15% | 12% | 4% |
| Nature Reflection/ Appreciation | 8% | 0% | 8% |
| Informal Experiences | 12% | 0% | 12% |
| Leadership Experience | 23% | 4% | 19% |
| Agricultural Education | 23% | 0% | **23%** |
| Unique Program Experience | 27% | 0% | **27%** |
| Outdoor Recreation | 31% | 4% | **27%** |
| Structured Education | 54% | 12% | **42%** |

Considering those tallies that differed by 20 points or more, youth had more frequent recollections about doing ecosystem and vegetation restoration work, as well as construction of structures such as trails and bridges. This is not surprising as youth respondents were chosen from summer programs that emphasized these activities in the Seattle, WA region. Inspection of the activities mentioned more often by professional adults shows strong recollections of programs having an educational aspect. Agricultural education (such as 4H and FFA), one time or unique programs (such as a marine biology camp), outdoor recreation tied to natural history studies, and structured nature learning (such as that provided by scout trips) were all recalled, suggesting lasting impressions, and perhaps career choice influences.

A follow-up question asked about the enjoyable aspects of any program, and again the two age groups were compared across eight response themes (Table 3):

**Table 3: Enjoyable Aspects of Programs, Professionals and Youth**

| Enjoyable Aspects | Pros %s (n=27) | Youth %s (n=26) | % difference |
|---|---|---|---|
| Social Dynamics | 11% | 42% | **-31%** |
| Environmental Stewardship | 11% | 23% | -12% |
| Skills, Competence & Achievement | 33% | 38% | -5% |
| Unstructured Experiences | 7% | 4% | 4% |
| Satisfying Physical Activity | 26% | 19% | 7% |
| Leadership & Engagement | 15% | 4% | 11% |
| Sensory & Aesthetic Experience | 33% | 12% | **22%** |
| Science & Natural History Learning | 44% | 8% | **37%** |

Looking at tallies that differed by 20 percent or more, youth provided many more comments about the positive social dynamics of their summer program. Meanwhile the adults remembered the pleasant aesthetic aspect of being outdoors, and well as learning opportunities that were linked to the tangibleness of natural history and field observation.

Both groups were also asked what in particular made their nature program experiences memorable, and content analysis produced eight response themes (Table 4):

**Table 4: Memorable Aspects of Programs, Professionals and Youth**

| Memorable Aspects | Pros %s (n=27) | Youth %s (n=26) | % difference |
|---|---|---|---|
| Stewardship & Giving Back | 7% | 15% | -8% |
| Outdoor Recreation & Physical Activity | 17% | 23% | -6% |
| Personal Development | 3% | 8% | -4% |
| Social Dynamics | 66% | 58% | 8% |
| Nature Identity & Appreciation | 21% | 8% | 13% |
| Sense of Achievement | 21% | 8% | 13% |
| Leadership & Opportunity | 21% | 8% | 13% |
| Teachers & Mentors | 34% | 4% | **31%** |
| Learning & Discovery | 34% | 4% | **31%** |

There were fewer differences across themes in these responses though adult professionals again recalled learning as a powerful aspect, describing both the people who guided their learning and a discovery process that was different than school-based learning. Both groups recalled that the social dynamics with peers and leaders in their groups added to memorableness.

*Career Influence* – The last group of questions had to do with life changes, including career choice for both youth and adult professionals. Youth reported a range of life changes that were a consequence of nature-based program experience with environmental awareness, and leadership or community engagement changes being most prominent (Table 5):

**Table 5: Life Changes Reported from Programs, Youth**

| Life Change | Youth %s (n=26) |
|---|---|
| Expand Community Awareness | 12% |
| Increase Personal Satisfaction & Benefit | 15% |
| Improve Interpersonal Skills | 19% |
| Expand Social Awareness | 19% |
| Change Education Interests | 27% |
| Greater Personal Efficacy & Impact | 27% |
| Build Leadership, Engagement & Service | 31% |
| Increase Environmental Awareness & Concern | 42% |

Despite the range of change reports, a minority of the youth indicated an interest in a career in natural resources, with 58 percent indicating "no" and 35 percent "yes." Nonetheless, 31 percent indicated an ongoing interest in volunteering and community service. Meanwhile, 82 percent of the professionals claimed in retrospect that their program experience as a youth affected a career choice in natural resources. Forty two percent indicated an early interest, while 25 percent noted that their choice was delayed.

Finally, professionals were asked about the particular early nature-based experiences that influenced their positive career choice in natural resources, including urban forestry. Eight categories of response emerged (Table 6):

**Table 6: Career Choice Influences from Programs, Professionals**

| Career Choice Influences | Pros %s (n=28) |
|---|---|
| Family Dynamics | 18% |
| Revealed Social Concerns | 21% |
| Nature Solace & Joy | 25% |
| Professional Modeling | 25% |
| UF as Unique Professional Niche | 29% |
| Nature Comfort & Affinity | 36% |
| Satisfactions & Aesthetics | 39% |
| Develop Aptitudes, Interests & Abilities | 61% |

The categories represent a wide range of aesthetic, emotional and cognitive consequences. In some instances the influences are of a personal nature, such as family dynamics and personal satisfactions from time in nature. One indicates expanded social awareness. Finally, several categories address the professional development that is a hallmark of adolescence when young people are exploring a public identity – developing aptitudes, professional modeling and learning about a profession. The range of responses is notable in the extent and variety of influences provided by a nature-based experience.

**Surveys**

On-line surveys were administered to professionals, and pencil-and-paper surveys were provided to youth following interviews. One bank of questions asked about frequency of participation in nature and outdoor activities (as remembered by professionals), in order to check for activity similarities. Other questions were from standardized measures of these concepts (literature background in Appendix C); Table 7 lists statistical results:

- environmental concern
- environmental identity
- self-efficacy

*Nature Activities and Values* – A 20 item list was prepared based on Chawla's writings about previous nature experiences (1998), and Lohr's work on urban forestry attitudes (2004). Each respondent rated items for level of agreement on a scale of 1 (strongly disagree) to 5 (strongly agree). Ratings were analyzed using Principal Axis Factor Analysis (Varimax rotation, eigen value > 1) to reduce data and derive response categories. To be included in a category an item must have a factor loading > 0.45, and not load on multiple categories; 7 items were eliminated. Means were calculated across all member items, generating a mean agreement rating for each category by professionals and youth. Table 8 contains four categories with member items.

Ratings for professionals and youth are fairly high across all four categories, with professionals showing higher means for each. Adults and youth both indicate a high level of concern for the environment, perhaps including the impact of pollution on outdoor recreation places. Both groups also reported a high level of ethical concern, expressed as fairness toward the environment and other people. Adult professionals reported higher levels of family support and involvement in environment, including place attachment and passive outdoor activities. On the other hand, professionals expressed a higher degree of experience with more formal and structured environmentally oriented activities, which may be a basis for building friendships. The Structured Activity and Friends category was the only one displaying a statistically significant difference between professionals and youth. Perhaps formal learning experiences are formative elements in long-term career interests.

*Environmental Identity* – The identity measures were those developed by Clayton (2003) with some revision to be more inclusive of urban experiences (as the original focus of the measures appeared to be rural and wildland settings). A rating system of agreement ranged from 1=strongly disagree to 4=strongly agree. Each respondent received a score based the sum of ratings across 23 verbal items.

Results are in Table 7. While both groups scored higher than respondents of prior studies (mean 64), the adult professionals scored significantly higher on environmental identity than did

the youth (78 versus 72). Again, as a one time data point, it is difficult whether to determine if the professionals had an innately higher identity with nature when younger, or whether their environmental identity has been strengthened by work experience.

*Environmental Concern* – The Environmental Motives Scale was developed by Schulz (2001) and has been widely used to assess environmental concern. The measure consists of 12 verbal items, and the respondent is asked to rate each for importance (on a scale of 1=not important to 7=supreme importance) based on this statement, "I am concerned about environmental problems because of the consequences for . . . . " The items represent 3 conceptual categories of 4 items each: biosphere, egotism, and altruism. Biosphere items present very broad classes of living things, such as plants and birds. Egotism is represented by brief statements of self interest, such as "my lifestyle" or "my future." Altruism represents concerns about broader societal consequences, and those of the future, such as "all people" and "future generations."

Table 7 shows statistically significant differences in mean scores on Altruism and Egotism, with near significance on Biosphere. Scores are within ranges of prior studies, and the professionals were higher on all as compared to youth. Youth also show more variability in their responses, having greater standard deviations. As career natural resource stewards, one would expect that the adult group would have greater concern for the biosphere, and as many are working in the public sector, their altruism scores are reasonably higher. The higher response on egotism may be a consequence of age, as older individuals may be more introspective about their personal future and conditions. The balance of scores suggests that people can be quite attentive to their own interests and demonstrate significant concern for other biological and social entities.

*Self Efficacy* – Table 7 also includes the outcomes on measures of Self-Efficacy, derived from a measurement tool by Cowen and colleagues (1991). The instrument contained 19 verbal items. Respondents were asked "How sure are you that you can make things work out well, when you . . . . . ?" with each of the verbal items finishing the phrase. The rating scale, used for each item, ranged from 1=not at all sure to 5=very sure. Imbedded within the instrument were four dimensions of self efficacy, based on theory and instrument development. A *general* dimension utilized all of the items to derive a mean rating. Three other dimensions were constructed of subsets of questions.

Professionals scored the same or slightly higher than the youth across each of the dimensions. None of the differences were statistically significant. Professionals reported being more sure of themselves in new situations in the *general* dimension. Considering *difficult situations* (7 items), professionals again judged themselves to be more confident. Youth reported an equal level of ability with professionals concerning *problems with people* (3 items). Professionals expressed more comfort with *new experiences* (8 items) than did youth, with a p-value of 0.049.

Respondents reported difficulty understanding the measure prompt. Another, more easily understood self-efficacy measure was used in later research phases.

### 2.4. Discussion

Due to the research design it is impossible to make conclusions about the causal relationships of youth nature-based experiences and adult career choice. Yet certain insights emerged from this exploratory set of interviews and surveys.

**Table 7: Youth and Professionals Surveys Comparisons, 2005**

| Construct | cases pro/yth | pros M | SD | yth M | SD | net diff | t-stat | sig | alpha | prior studies means |
|---|---|---|---|---|---|---|---|---|---|---|
| Environmental Concern - biosphere | 26/26 | 6.14 | .97 | 5.53 | 1.39 | -0.61 | -1.853 | .07 | .017 | 5.47, 5.48 |
| Environmental Concern - egotism | 26/28 | 5.77 | 1.14 | 4.91 | 1.49 | -0.86 | -2.369 | .022 | .017 | 5.78, 5.84 |
| Environmental Concern - altruism | 26/27 | 6.49 | .67 | 5.42 | 1.20 | -1.07 | -4.048 | .000 | .017 | 5.33, 5.46 |
| Environmental Identity | 26/31 | 78.06 | 8.51 | 72.26 | 8.81 | -5.8 | -2.509 | .015 | .05 | 64.20 |
| Self Efficacy – general | 25/29 | 3.80 | .53 | 3.61 | .49 | -0.19 | -1.355 | .181 | .05 | |
| Self Efficacy – difficult situations | 25/29 | 3.81 | .51 | 3.61 | .56 | -0.20 | -1.383 | .173 | .017 | |
| Self Efficacy – problems with people | 26/29 | 3.77 | .64 | 3.77 | .70 | - | .005 | .996 | .017 | |
| Self-Efficacy – new experiences | 26/29 | 3.87 | .61 | 3.57 | .51 | -0.30 | -2.020 | .049 | .017 | |
| Nature Activities/Values-Family Support & Passive Activity | 26/29 | 3.89 | .87 | 3.53 | .67 | -0.36 | -1.716 | .092 | .013 | |
| Nature Activities/Values-Structured Activity & Friends | 26/29 | 4.52 | .53 | 3.67 | .33 | -0.85 | -7.172 | .000 | .013 | |
| Nature Activities/Values-Concern & Action | 25/29 | 4.44 | .63 | 4.33 | .67 | -0.11 | -.629 | .532 | .013 | |
| Nature Activities/Values-Environmental Fairness | 26/29 | 4.67 | .34 | 4.47 | .58 | -0.20 | -1.586 | .119 | .013 | |

**Table 8: Nature Activities and Values Categories - Youth and Professionals, 2005**

| | factor loading | pro mean | youth mean | t-stat | p value |
|---|---|---|---|---|---|
| **Family Support and Passive Activity** | | **3.89 (0.87)** | **3.53 (0.67)** | **-1.716** | **.092** |
| When I was younger, my family felt a connection to a certain parcel of land (farm or ranch, forest, public green space). | .771 | | | | |
| When I was younger, my parents had values that are in favor of quality environment. | .767 | | | | |
| When I was younger, my family did outdoor activities (such as hiking or gardening) together. | .739 | | | | |
| When I was younger, family members supported or assisted my work on environmental projects | .731 | | | | |
| I enjoy quieter outdoor activities, such as birding, photography, nature walks, or gardening | .605 | | | | |
| **Structured Activity and Friends** | | **4.52 (0.53)** | **3.67 (0.33)** | **-7.172** | **.000** |
| I have volunteered with organizations that do programs to improve the environment | .802 | | | | |
| I have taken classes on biology, ecology or nature | .752 | | | | |
| I have had a job where I was paid to work on projects related to the environment | .647 | | | | |
| I have friends who share my interests in the environment and nature | .502 | | | | |
| **Concern and Action** | | **4.44 (0.63)** | **4.33 (0.67)** | **-.629** | **.532** |
| I am concerned about pollution or the dumping of waste within my community | .768 | | | | |
| I enjoy active outdoor activities, such as hiking, backpacking, biking, kayaking, skiing or rock climbing. | .734 | | | | |
| **Environment and Fairness** | | **4.67 (0.34)** | **4.47 (0.58)** | **-1.586** | **.119** |
| It's not fair if polluters or developers harm the environment | .747 | | | | |
| When I was younger, my family valued being fair and doing what is right for other people. | .632 | | | | |

First, professionals' responses suggest the importance of ongoing, multiple nature experiences through adolescence, rather than relying on a single encounter to nurture nature interests. The remembered experiences are quite varied, including a combination of sensory, emotional, cognitive and behavioral modeling influences.

Second, influential experiences were more formal in structure and content, provided guided learning and competence in an environmental endeavor. Learning combined with achievement was fondly remembered. Key adults served as mentors and experience guides.

Social dynamics with peers were quite important in the memories of youth and adults. Interestingly, youth focused on social aspects, with fewer reports of the value of learning. Are future professionals those who pursue and enjoy learning opportunity more within a short-term

program? Or were programs of the past more oriented to education as compared to field tasks and programs?

In summary, the interview results speak to how programs are developed and offered to youth, and how they might reveal and nurture interest in natural resources careers. The importance of multiple programs suggests that organizations should take a broader view of their programs to assess their own program within a context of multiple age and activity focused experiences across the teen years. Can the range of experience needed to nurture nature in youth be provided by a single organization? Probably not. A regional coalition of organizations that offer an interlinked series of programs, including mentored learning, may more effectively reach and benefit young people. Results also suggest that experiences in late high school may shape career interest more directly.

The survey data is less readily understood and synthesized. No comparison data was available, either for the sample group over time, or for comparable individuals of similar circumstances (a control group). Generally, professionals rated themselves higher on environmental concerns, environmental identity, various dimensions of self-efficacy, and greater involvement in environmental concerns and values.

Some of the ratings differences between professionals and youth were statistically significant. Professionals showed a significantly higher level of environmental identity, greater attention to self concerns (or egotism) and altruism in environmental concern, greater confidence in the face of new experiences, and a higher level of structure in their nature-based activities. We do not know whether the higher ratings were due to innate traits of professionals, are perceptions reinforced by their work, or are even a consequence of older age and greater maturity. In terms of future research, these findings suggest that tying together environment and self interest may be an effective communications approach, with such relationships demonstrated in structured learning activities.

# 3. PROGRAMS FIELD SURVEYS-SUMMER 2005

Thousands of adolescents and teenagers from U.S. cities participate in forestry and greening projects each year. Project locations span the landscape gradient from the inner city on out to suburbs, rural areas and wildlands. Activities include trail building, tree planting, ecosystem restoration, habitat creation and parks maintenance. Youth participate as volunteers, are employed, or are assigned by counselors or court.

Nature service projects often have two purposes. Improving the landscape and ecology of a community or site is one goal. Creating positive influences for young people is another. Program managers, field leaders, scientists and program sponsors have observed remarkable changes in project participants. Most accounts of change are anecdotal. More quantitative evaluation measures are needed.

The second phase of research project was based in the Pacific Northwest, but was conducted throughout the United States. The purpose was to evaluate, using multiple measures, the psychological, sociological, and transition-to-adult benefits associated with youth working in nature based programs.

This section will provide a quick overview of key concepts, then introduce a conceptual framework of measures. More detailed treatment of the theory behind the measures, and the mechanics of measurement are in Appendix C. Results and discussion of the outcomes will end this section.

## 3.1. Background

The concept of Positive Development focuses on positive individual traits and positive formative experiences that promise to improve quality of life and prevent psychosocial issues for individuals. Positive Youth Development is being widely adopted, and supporters are creating programs that help adolescents become healthy, effective, and productive members of society.

There is also an emerging concern about an absence of direct physical contact and experience with nature in childhood, and the consequences for child and youth development. Louv's book, *Last Child in the Woods* (2005) laments that the narrowing of senses that comes with virtual experiences of the world reduces the richness of experience of the world with physiological and psychological consequences.

Meanwhile, numerous studies over several decades have evaluated outcomes of wilderness programs, finding developmental benefits for participants. There is a notable absence in these efforts – knowledge about the potential beneficial affects of urban forest and city green experiences.

This section presents a survey based study that evaluated urban underserved youth who participated in urban forestry projects. Overall the research was an effort to bridge two domains of theory and research that have rarely intersected. The literature of developmental psychology is broad and deep. The literature of youth program evaluations is modest, yielding insights about the value of nature experiences, particularly in wilderness. The research goal was to quantitatively measure youth affects of personal and social development, increased ability in civic affairs and community dynamics, employability and career interests, and eco-literacy.

### Quantitative Measures

Building upon the interviews and preliminary surveys of Phase I research, an expanded measurement instrument was constructed. There is some criticism that a scientific approach that

emphasizes quantitative measurement may seem too structured and narrow. Yet empirical research is important to practitioners as a means of improving knowledge, and to external audiences to increase their appreciation for programs and better understand how programs benefit youth and communities.

The concepts and constructs that were chosen for measurement were derived from the immense psychosocial literature that has emerged around adolescent human development. Social scientists in education, psychology and sociology have applied rigorous procedures to expose and define the complex intra- and interpersonal dynamics at a pivotal stage of human growth and development. The scientific process of discovery has included development and refinement of measurement scales that are applicable to human audiences in diverse populations and situations.

The scales that were chosen for this research are but one set of tools that can be used in empirical assessment. Research designers must use good judgment and creativity to determine which tools are appropriate, which procedures are best suited to investigate particular questions, and what inferences can be drawn from the data collection (Bringle et al. 2004).

## 3.2. Methods and Procedures

### Measurement Constructs

Based on the purposes of the study and review of literature on adolescent development, a battery of measures constructs was selected. Thus, the surveys contained psychometric measures that have met standards of research validity and reliability in their development and subsequent use. Some of the measures have been used in pre- and post testing, while others are typically administered once to reveal the range of expression of traits across a population. In this research program the surveys were administered in an effort to detect youth development changes associated with participation in urban forestry and natural resources programs.

Appendix C contains the theoretical background for each of the constructs below, and an overview of measurement approach. Appendix K contains the actual survey instrument. The pre and post surveys included measures for:

- Self-Concept
- Self Efficacy
- Environmental Identity
- Environmental Concern
- Civic Engagement[4]

### Surveys Administration

The measures were distributed by EarthCorps and administered by youth program staff of partner organizations, under the supervision of the lead scientist. Eight urban forestry programs throughout the U.S. were sent survey packets containing preprinted surveys (Appendix K), model youth assent and parent consent forms (Appendices E and F), and directions for administering the surveys (Appendix L). Packets were sent early in the summer for pre-tests, in late summer for post-tests.

Selection of the programs or field sites was dependent on multiple criteria. Programs were recruited on recommendation of the Alliance for Community Trees, a coalition of non-

[4] added civic engagement to surveys after reviewing interviews

profit urban forestry organizations, and state urban forestry coordinators. Inner-city youth programs were selected based on best fit with selection criteria (Table 9). Appendix M is a recruitment flyer, sent as an attachment with contact e-mails.

**Table 9: Program Criteria for Study Partners**

| | |
|---|---|
| **Partner Organizations** | Non profits, government agencies, schools. |
| **Partner's Tasks** | Conduct pre- and post tests with youth who are participating in summer programs. All materials and data analysis to be provided by EarthCorps. |
| **Youth Characteristics** | In the age range of 15-19. Participating in a program providing 60+ hours of program activity. |
| **Program Activities -primary** | Focused on urban forest stewardship that is conducted primarily on public property (not to include USFS National Forests) and includes one or both of the following activities. A) Restoration of natural areas, being part of local ecosystems, may provide wildlife habitat, and passive recreation for people, and B) Tree planting, for community green space improvements. |
| **Program Activities - secondary** | Additionally include one or more of the following developmental activities for youth: education, leadership development, and/or job skills |

In total, 8 programs from the throughout the United States participated in Summer 2005 data collection, each starting with 5 to 41 youth, for a total of 119 initial participants. All youth were voluntary participants (some paid, some not), and the service programs were not a part of a formal K-12 curriculum. Post tests were completed by 88 youth, a 26 percent attrition rate from pretests, with each program's attrition ranging from 0 to 44 percent.

### 3.3. Results

Respondent demographics were analyzed using frequencies to confirm that the resulting youth sample met goals of outreach to programs serving minority youth, and age criteria. Paired comparisons t-tests were used to compare means on each developmental measure between pre and post-tests, to determine if an extended nature-based service experience contributed developmental benefits. Pre/post scores were also compared on various demographic traits.

#### Demographic Traits

African American youth represented 50 percent of the respondents, 11 percent Spanish, 11 percent multi-racial, 7 percent Caucasian, and up to 3.5 percent of youth indicating American Indian or Asian background. Thirty seven percent of participants were female, 58 percent reported being male. With regard to age most respondents were in the 14 to 17 age range: 17 percent at 14, 29 percent at 15, 21 percent at 16, 15 percent at 17, and none were older than 19 or younger than 10 years of age. Twenty-six percent of respondents did not answer the question

about public assistance to their household; of those that did 20 percent claimed to receive assistance.

Prior program experience was quite variable with 33 percent never having participated in a prior program, 22 percent once before and 41 percent having participated in two or more prior programs. Few participants were frequent participants in non-programmed outdoor activities, such as camping, day hikes, hunting or fishing, wildlife watching, boating, and mountain sports. More frequent participation was reported for spending time at the beach, in outdoor classrooms, and nature art.

**Developmental Concepts**

The pre and post-test surveys were identical, built upon the same concepts of youth development. The survey is displayed in Appendix K, and full theoretical background is in Appendix C. Results are reported across developmental concepts in Table 10, and are summarized here. Pre and post tests were also analyzed by demographic categories (Table 11) and highlights are described.

*Self Concept* – The Self-Perception Profile for Adolescents (Harter 1988) is a 45-item self-report scale that assesses nine dimensions of self-concept and self-esteem. Seven of nine subscales were used for this study: Global Self-Worth, Social Acceptance, Athletic Competence, Physical Appearance, Job Competence, Behavioral Conduct, Close Friendship. Five items represent each subscale, rated on a scale of 1 to 4 (low to high), and scores are expressed as means across items.

The pre-test scores for each self-concept subscale were generally around 3, and most were somewhat greater than scores found in prior studies. All post-test scores were slightly lower than pre-test, though no differences were statistically significant.

*Self Efficacy* –The Self-Efficacy Scale by Sherer et al. (1982) contains 23 verbal items (plus 7 filler items). It asks respondents to indicate how certain they are about their capabilities to attempt new activities and persevere through difficult activities. Two subscales address General Self-Efficacy and Social Self-Efficacy. The self-rating scale is from 1=disagree strongly to 5=agree strongly. Scores are tallied across items providing a high score of 85 for General, and 30 for Social.

Both General and Social Self-Efficacy scores were again slightly higher than those found in prior studies. Both declined in value from the pre- to post-test, with the change in General Self-Efficacy being statistically significant ($t=2.767$, $p=.006$).

*Environmental Identity* – The identity measures were those developed by Clayton (2003) with some revision to be more inclusive of urban experiences (as the original focus of nature experiences seemed to be rural and wildland settings). A rating system of agreement ranged from 1=strongly disagree to 4=strongly agree. Each respondent received a score based the sum of ratings across 23 verbal items.

Environmental Identity scores were less than prior studies, and showed slight increase across the measurement period, but were not statistically significant.

*Environmental Concern* – The Environmental Motives Scale was developed by Schulz (2001) and has been widely used to assess environmental concern. The measure consists of 12 verbal items, and the respondent is asked to rate each for importance (on a scale of 1=not

important to 7=supreme importance) based on this statement, “I am concerned about environmental problems because of the consequences for . . . . “ The items represent 3 conceptual categories of 4 items each: biosphere, egotism, and altruism.

In the pre-test concern for biosphere was lower than prior studies, while egotism and altruism were higher. No post-test changes were statistically significant at *alpha* = .017 (.05/3 for

**Table 10: Pre/Post Surveys Statistical Outcomes - All Programs, 2005**

| Construct | cases pre/pst | pre-test M | SD | post-test M | SD | net change | t-stat | sig | alpha | prior studies means |
|---|---|---|---|---|---|---|---|---|---|---|
| Environmental Identity | 119/88 | 62.38 | 8.97 | 62.43 | 10.49 | + | -0.033 | .974 | .05 | 64.20 |
| Self Efficacy – general | 119/88 | 65.56 | 8.72 | 61.96 | 9.92 | - | 2.767 | .006 | .025 | 61.79 |
| Self-Efficacy – social | 119/88 | 21.09 | 3.78 | 20.15 | 3.08 | - | 1.898 | .059 | .025 | 20.71 |
| Environmental Concern - biosphere | 93/66 | 4.87 | 1.60 | 4.77 | 1.70 | - | 0.394 | .694 | .017 | 5.47, 5.48 |
| Environmental Concern - egotism | 97/70 | 6.24 | 1.18 | 6.55 | 0.84 | + | -1.937 | .054 | .017 | 5.78, 5.84 |
| Environmental Concern - altruism | 96/69 | 5.61 | 1.30 | 5.50 | 1.65 | - | 0.452 | .652 | .017 | 5.33, 5.46 |
| Self Perception - social acceptance | 87/69 | 3.13 | 0.60 | 3.11 | 0.59 | - | 0.180 | .857 | .05 | 3.02 |
| Self Perception – athletic competence | 87/69 | 2.86 | 0.73 | 2.75 | 0.72 | - | 0.936 | .351 | .05 | 2.71 |
| Self Perception – physical appearance | 87/69 | 2.96 | 0.76 | 2.83 | 0.75 | - | 1.112 | .268 | .05 | 2.66 |
| Self Perception – job competence | 87/69 | 3.25 | 0.49 | 3.20 | 0.55 | - | 0.571 | .569 | .05 | 3.14 |
| Self Perception – behavioral conduct | 87/69 | 2.86 | 0.63 | 2.85 | 0.54 | - | 0.050 | .960 | .05 | 2.78 |
| Self Perception – close friendship | 87/69 | 3.00 | 0.68 | 2.95 | 0.69 | - | 0.456 | .649 | .05 | 3.20 |
| Self Perception – self worth | 87/69 | 3.14 | 0.66 | 3.09 | 0.60 | - | 0.511 | .610 | .05 | 2.99 |
| Civic Action | 114/84 | 3.66 | 0.87 | 3.52 | 0.91 | - | 1.147 | .253 | .05 | 3.98, 4.03 |

## Table 11: Pre/Post Field Surveys by Demographic Traits – All Programs, 2005

| Construct | female | male | pblc asst no | pblc asst yes | ethncty white | ethncty black | ethncty hispnc | no prior progrm | >2 prior progrm | no/pre x >2 post | actvty few | actvty more | few/pre vs more/pst | age 14 | age 17 | 14/pre vs 17/post |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Env Identity | - | - | + | 67.18/ 61.10 ** | + | - | + | + | + | 59.97/ 66.46* | + | + | 55.14/ 67.97 * | - | + | 61.67/ 65.50 ^ |
| Self Eficy – general | 65.87/ 62.15 ** | 65.57/ 62.18 ** | 66.52/ 63.31 ** | - | + | 66.64/ 62.46* | + | - | - | + | 68.17/ 57.10 * | - | - | - | - | 62.82/ 67.96 ** |
| Self Eficy – social | - | 21.24/ 19.89 * | 21.59/ 20.30 * | - | + | 21.65/ 19.69* | + | - | 21.91/ 20.63 ^ | + | 22.55/ 19.65 ^ | - | - | + | - | - |
| Env Cncrn - biosphere | - | - | + | 5.19/ 4.33 ^ | + | - | + | 4.20/ 4.86 ^ | - | 4.24/ 5.10 ** | 4.31/ 3.48 ^ | + | 4.31/ 5.38 ^ | 5.13/ 4.30 ^ | + | - |
| Env Cncrn - egotism | + | 6.21/ 6.57 ** | 6.18/ 6.71 * | + | 5.82/ 6.69 ^ | 6.20/ 6.53 ^ | 6.31/ 6.75 ^ | 6.19/ 6.71 * | + | 6.10/ 6.46 ^ | 6.23/ 6.73 ^ | + | + | + | 6.11/ 6.69 ^ | 6.01/ 6.69 * |
| Env Cncrn - altruism | + | - | + | - | + | - | - | 5.31/ 6.02 * | 6.07/ 5.46 ^ | + | - | 6.11/ 5.26 ^ | - | + | - | - |
| Slf Prcptn - social acceptance | + | + | - | + | + | - | + | + | - | 2.93/ 3.20 ^ | 3.27/ 2.85 ^ | + | - | - | + | - |
| Slf Prcptn – athletic competence | - | - | - | - | - | - | + | - | 3.10/ 2.87 ^ | 2.57/ 2.87 ^ | - | - | + | - | + | + |
| Slf Prcptn – physical appearance | 3.03/ 2.76 ^ | - | - | - | + | 3.18/ 2.95 ^ | - | - | - | + | 3.47/ 2.63 ^ | + | - | + | + | + |
| Slf Prcptn – job competence | - | - | - | 3.56/ 3.22 ** | + | - | + | + | - | + | 3.46/ 3.09 * | - | 3.46/ 3.23 ** | + | + | 3.19/ 3.44 ^ |
| Slf Prcptn – behavioral conduct | - | + | + | - | + | = | - | 2.81/ 2.86 ^ | - | 2.61/ 2.89 ^ | - | = | + | + | - | - |
| Slf Prcptn – close friendship | 3.27/ 3.00 ^ | + | + | 3.23/ 2.77 ** | + | - | - | + | + | 2.78/ 3.03 ^ | - | + | - | - | 2.81/ 3.15 ^ | - |
| Slf Prcptn – self worth | - | - | + | 3.54/ 3.22 ^ | + | - | - | + | - | + | 3.42/ 3.00 ^ | + | - | + | + | + |
| Civic Action | 3.89/ 3.65 ^ | 3.59/ 3.41 ^ | - | 3.91/ 3.46 ^ | - | 3.71/ 3.42 ** | 3.49/ 4.34 ** | + | + | 3.35/ 3.99 * | - | - | 3.51/ 4.01 ^ | - | + | + |

**Legend:**

1. + is positive change in post-test, - is negative change in post-test
2. p values on independent samples t-tests: * $p \leq .05$, ** $p = >.05$ to 0.1, ^ $p = >0.1$ to 0.25

multiple comparisons). Interestingly, biosphere and altruistic concerns declined in the post-test, while egotism scored higher.

*Civic Engagement* –The Civic Action scale is one of six subscales of the Civic Attitude and Skills Questionnaire, (CASQ) and measures intentions to become involved in the future in community service or action (Moely et al. 2002). Respondents indicate their agreement or disagreement on a 5-point response range for each of 8 items. Participants mark a scale from 1 (completely disagree) to 5 (agree completely). Respondent scores are expressed as a mean across all items.

Pre-test Civic Action commitment was lower in the pre-test than prior studies, and declined in the post-test, though not to a significant degree.

**Demographics Relationships**

Pre and post tests were also analyzed by demographic categories (Table 11) and results at $alpha \leq 0.05$ significance are described.

Concerning gender the only significant outcome was that males show decreased scores on Social Self-Efficacy. Those who lived in households that did not receive public assistance also showed decreased scores on Social Self-Efficacy as well as increased scores on the Egotism dimension of Environmental Concern. Looking across ethnic background, Black American youth showed declines in General and Social Self-Efficacy in the post-tests. No significant differences appear to be associated with age of program participants.

Prior program experience data were recoded to provide additional comparisons. Youth who had never participated in nature-based programs showed increases in Egotism and Altruism within Environmental Concern. When comparing youth with no prior experience to those having been in multiple prior programs, Environmental Identity and Civic Action was higher for those having more experiences.

Individuals who are participating in few nature activities outside of the program reported declines in both General Self-Efficacy and self perceptions of Job Competence.

Looking across traits by developmental construct, there is a persistent pattern of increased ratings of Egotism within Environmental Concern. Both General and Social dimensions of Self-Efficacy also show declines across demographics. Though not statistically significant these outcomes run counter to anecdotal reports from youth programs.

### 3.4. Discussion

Each of the measures selected for this research can be used in multiple ways. A measure can be administered one time, providing a snap shot of the attitudes, values or perceptions of a group of youth within a selected situation. Or, as in this study, they can be administered before and after an intervention or change, becoming a useful measure of the extent to which real-world policies or experiences affect the ways in which individuals think about themselves, others, and their relationship to environment.

Despite expectations of some degree and extent of personal change due to nature program participation, remarkably few pre- and post- test differences were detected.

It is unlikely that the selected measures were procedurally or theoretically insufficient. Each of the development measures scales are professionally and scientifically recognized assessments for specified constructs. Pre- test scores were within the ranges found in prior studies, confirming the reliability of the measures. In addition to statistical tests of outcomes, a

correlation analysis was conducted across all outcomes measures, with results confirming the construct validity of each measures battery.

Prior literature, though associated primarily with wilderness programs, has demonstrated developmental benefits. Why were no changes detected in this study? There are several possibilities.

First, urban-based programs may not compel development change in the same ways as wilderness programs. The literature on wilderness programs notes that complete removal from all life circumstances that are familiar, combined with and a high degree of physical challenge, and building competence in survival skills, are precursors of personal change in youth. The urban nature programs we included in the study were all day programs, where youth typically worked during weekday business hours, sometimes culminating in a brief camping trip. The purpose of such programs is to immerse youth in community dynamics via nature projects, rather than to test their emotional and physical mettle. Perhaps these different purposes and conditions instill more incremental and/or less degree of personal change.

Second, the modest changes in pre/post test scores may also speak to the stability of these traits in young people. Despite the supposed emotional volatility of adolescence, many young people may experience adolescence less as a dramatic reconfiguration of self, and more as a revision and refinement of underlying traits. As best we could determine, few of the participating youth were at risk, so most participants may have started at a high "baseline" of positive development. Considering these conditions, could any youth program of a one-to-two month duration influence developmental and environmental personal traits?

One outcome of interest in the consistent increase in Egotism of the Environmental Concern scale. It can be claimed that an environmental perspective is more compatible with collectivism than with individualism. Self-described environmentalists usually focus on larger communities – such as ecosystems – and stress interdependence (Clayton 1998). A perspective of Egotism is expressed widely within American society. For example, a recent report by the National Association of Secretaries of State (in 1999) asserted that even though service involvement among adolescents was increasing, their involvement in political activities remained decidedly individualistic as they showed little interest in the larger civic realm. Other studies have also had difficulty linking adolescents' service experiences to enhanced civic-social attitudes (Melchior 1998) or to beliefs that their efforts had made a difference in the community (Blyth et al. 1997).

The developmental process of self-concept is complex, and traditional theorists characterize the effort as a series of stages of small crises or conflicts and their resolution (Erikson 1982, Marcia 1989). Part of identity development is role confusion, as childhood conditions of basic competencies and parental intimacy give way to more complex activity, occupational development, and social dynamics. Perhaps the explicit and implicit "lessons" of the nature programs challenged youth to consider their role in society and how personal actions impact the environment. Perhaps a boost in Egotism is the first step in a consolidation of new attitude or self-perception, a form of cognitive dissonance. What follow-up experiences might aid in resolution of this tension, favoring greater environmental concern and identity, as well as more general personal development?

There were methodological limitations, and these may have had some effect on outcomes. First, all study participants were self-selected, and some entered programs after a competitive screening of applicants. Thus there may have been reduced variability in both the personal traits, and program responses, of participants. Random assignment of youth to programs

would have been optimal for such a study, but not feasible given the resources available for the project. Also, when preparing the pre/post surveys it seemed that many of the instruments measures were developed in studies with Caucasian, and late adolescent to early adult participants; perhaps the measures were not as effective in assessing young people of diverse cultural background. Another issue was the dropout rate between pre/post surveys; those who left the programs may have expressed certain traits that would have changed outcome scores. Finally, it became apparent during data entry that the field administration of pre/post surveys was not done with equal care among the field programs. This was a persistent difficulty as the measures instruments are typically administered in classroom or treatment facilities, rather than forest and field settings.

# 4. PROGRAMS FIELD SURVEYS-SUMMER 2006

The 2005 pre- and post- test surveys were conducted with two purposes in mind. The first, and primary purpose, was to develop a battery of measures that could be used to quantify associations between urban nature-based programs for youth and developmental benefits. The second was to provide the measures in such a way that they could be administered by local program staff without the direct guidance of a science specialist.

Data entry suggested that there were inconsistencies in how participating youth responded to the surveys, suggesting variations in survey administration across programs. Data analysis revealed surprisingly few positive associations, considering prior studies.

The project collaborators decided to repeat the measures program, but on a limited scale, focusing only on EarthCorps programs in Summer 2006. Greater effort was made to assure methods consistency in the field. In addition, it was hypothesized that taking more time with the youth to reflect on their activities would enable them to better integrate their experiences and personal development, thus reflection exercises were added as an intervention.

The Summer 2006 pre- and post-tests were administered across Seattle programs, with greater attention to staff training, and with introduction of weekly reflection exercises.

## 4.1. Background and Literature

Reflection can be a powerful tool for "consolidating" a range of experiences to yield insight about self and others. The role of reflection in experiential education has been noted, and is probably salient to other formative experiences. Reflection is an essential element of experiential education (Kraft & Kielsmeier 1995), that is, education that happens outside the bounds of the formal classroom and entails direct involvement in community. In this context "reflection" means "the activity of a person to consider a past experience or event and the impact it has had or "where the learner observes, interprets, and reflects upon his learning experience" (Google 2007).

Without reflection, an experience will not be as educationally beneficial to the learner (McElhaney 1998). Reflection is a process that can sort life's random moments, and bring to mind with greater clarity the relevance of past experience. Without the "bridge building" of reflection, "what is learned in the woods will stay in the woods, what is learned in science will stay in science, and what is learned in school will stay in school" (Kraft & Kielsmeier, 1995).

## 4.2. Methods and Procedures

The survey content of Summer 2005 was replicated in 2006, and included the following measures constructs:

- Self-Concept – Self Perception Profile for Adolescents (Harter 1988)
- Self Efficacy - General and Social Self-Efficacy Scales (Sherer et al. 1982)
- Environmental Identity (Clayton 2003)
- Environmental Concern - Environmental Motives Scale (Schulz 2001)
- Civic Engagement - Civic Action scale of the Civic Attitude and Skills Questionnaire, CASQ (Moely et al. 2002)

There is some concern about administration of Harter's self-perception scales (Wichstøm 1995). Each verbal item contains a presentation of two groups of persons who are dissimilar on a characteristic on the left side and the right side of the questionnaire, respectively. The respondent is first asked to decide which group she resembles the most, right or left. Then she is asked to indicate whether the description of these persons is "really true for me" or "sort of true for me." The unusual question format is claimed to prevent social desirability from influencing responses, but has disadvantages. The question format takes some time to read and is complicated, so lengthy instruction is needed. More importantly, some respondents may misunderstand the logic behind the question format. Marsh and Holmes (1990) reported that 31% of their subjects filled out the surveys incorrectly. Some of these difficulties were noted in summer 2005, particularly in surveys received from remote program locations. Greater effort was given to survey administration in 2006, with observed improvements in response mechanics.

As noted above, reflection exercises were added to the program content, but no explicit measure of reflection was included.

**Surveys and Sites**

The pre- and post test surveys were administered across EarthCorps youth programs during Summer 2006, with a higher level of supervision by program senior staff and the project social scientist. Each of the field sites met the overall program criteria: participating youth in the 15-19 age range, 60+ hours of program activity, urban forestry stewardship activity (including natural area restoration and/or tree planting), and supplemental activities dedicated to education, leadership or job skills.

Across three field sites there were 34 initial participants. All youth completed the post-test for a 0 percent attrition rate. All youth were voluntary participants, with some receiving compensation for their summer work.

### 4.3. Results

**Demographic Traits**

Again project goals of inclusion of minority and underserved youth were met by program enrollment. Twenty-two percent of participating youth were White, and other participants represented diverse cultural backgrounds: 24 percent of East and Southeast Asian origins, 18 percent African American, 15 percent Latin or Hispanic, and 16 percent of mixed race. Gender was more equalized than the national sample with 47 percent female, and 49 percent male. Considering age the summer 2006 participants were somewhat younger with 31 percent being age 13, 27 percent age 14, and 19 percent reporting their age as 15, and none were older than 17. Most respondents did answer the question about household finances, with 10 percent indicating they did receive public assistance. Generally the Summer 2006 participants were younger, culturally more diverse, and somewhat more affluent than Summer 2005 participants.

The 2006 EarthCorps participants were more likely to have participated in prior programs. Eighteen percent reported no prior program experience. Twenty four percent reported one prior experience, and 59 percent had participated in a nature-based program two or more times. Few youth participated frequently in non-programmed outdoor activities, such as camping, day hikes, hunting or fishing, wildlife watching, boating, and mountain sports, but they did report a somewhat higher level of participation than the 2005 participant group. More frequent participation was reported for spending time at the beach, in outdoor classrooms, and nature art.

**Developmental Concepts**

The pre and post-test surveys were identical to each other, and to the instruments used in 2005 (Appendix K, with full theoretical background in Appendix C, and abbreviated measures structure in Section 3.3). Results are reported across developmental concepts in Table 12, and are summarized here.

Using paired comparisons t-tests, no statistically significance differences in scores were observed between pre- and post-tests at *alph*a $\leq 0.05$. Scores are generally consistent with outcome scores recorded from other studies, though the Summer 2006 group was somewhat higher than prior studies on self-efficacy, egotism and altruism.

**Demographics Relationships**

Pre and post tests were also analyzed across demographic categories (Table 13) and highlights are described (*alpha* $\leq 0.05$). Slight patterns within rows and columns were observed.

Environmental Identity declined, though only those with multiple prior program experience showed significant change (67.62/62.40). The Biosphere dimension of Environmental Concern declined, with significant changes for those with few prior program experiences (5.70/4.57) and who participate in few outdoor activities (5.64/4.73). Meanwhile, the Egotism scores were greater in post tests, with Black youth showing significant increases (5.90/6.86). Self perceptions of social acceptance both increased and decreased, with White youth (4.00/3.08) and all youth with little prior program experience (3.22/2.67) showing decline. Intentions of future Civic Action generally declined, particularly for Hispanic youth (3.78/2.78).

Considering patterns within demographic traits, those who are independently highly involved in outdoor activities displayed higher post-test scores on many of the developmental constructs, though none were significantly different. Perhaps the program experience was an additive experience, building prior activities and self perceptions associated with nature. Meanwhile, White youth showed declining scores on all developmental traits, with Self Perceptions social significance being significant (4.00/3.08). Perhaps this result has as much to do with the interpersonal and social dynamics of mixed race work groups, as it does with a structured nature encounter.

## 4.4. Discussion

Few differences in outcomes were noted between the 2005 and 2006 research phases. The demographic make up of the participant group in the Seattle program was younger, and more culturally diverse. Yet the values of outcome scores were consistent with both the 2005 trials and reported scores of other studies, again suggesting high trait stability in mid-teen youth. No statistically significant changes were noted on the developmental measures, despite efforts at better survey administration, and the addition of reflection exercises during the field programs. Notably, scores of Egotism were higher in the post-test (though not statistically significant).

**Table 12: Pre/Post Surveys Statistical Outcomes – Seattle Programs, 2006**

| Construct | cases pre/pst | pre-test M | SD | post-test M | SD | net change | t-stat | sig | alpha | prior studies means |
|---|---|---|---|---|---|---|---|---|---|---|
| Environmental Identity | 34/34 | 65.84 | 9.44 | 63.12 | 8.51 | - | 1.773 | .085 | .05 | 64.20 |
| Self Efficacy – general | 34/34 | 65.55 | 8.56 | 64.70 | 8.71 | - | .509 | .614 | .025 | 61.79 |
| Self-Efficacy – social | 34/34 | 21.95 | 4.41 | 21.25 | 3.83 | - | .963 | .343 | .025 | 20.71 |
| Environmental Concern - biosphere | 30/30 | 5.55 | 1.42 | 5.01 | 1.53 | - | 1.417 | .167 | .017 | 5.47, 5.48 |
| Environmental Concern - egotism | 29/29 | 5.98 | 1.19 | 6.34 | 1.05 | + | -1.236 | .227 | .017 | 5.78, 5.84 |
| Environmental Concern - altruism | 29/29 | 6.12 | 0.88 | 5.83 | 1.23 | - | 1.331 | .194 | .017 | 5.33, 5.46 |
| Self Perception - social acceptance | 30/30 | 3.26 | 0.61 | 3.13 | 0.54 | - | .849 | .403 | .05 | 3.02 |
| Self Perception – athletic competence | 29/29 | 2.71 | 0.72 | 2.78 | 0.66 | + | -.404 | .689 | .05 | 2.71 |
| Self Perception – physical appearance | 29/29 | 2.76 | 0.79 | 2.85 | 0.76 | + | -.553 | .585 | .05 | 2.66 |
| Self Perception – job competence | 28/28 | 3.11 | 0.50 | 3.13 | 0.49 | + | -.113 | .911 | .05 | 3.14 |
| Self Perception – behavioral conduct | 28/28 | 2.91 | 0.66 | 3.02 | 0.68 | + | -.643 | .525 | .05 | 2.78 |
| Self Perception – close friendship | 29/29 | 3.04 | 0.73 | 3.17 | 0.66 | + | -.652 | .520 | .05 | 3.20 |
| Self Perception – self worth | 30/30 | 3.22 | 0.59 | 3.04 | 0.59 | - | 1.300 | .204 | .05 | 2.99 |
| Civic Action | 32/32 | 3.97 | 0.73 | 3.72 | 0.87 | - | 1.359 | .184 | .05 | 3.98, 4.03 |

**Notes:** Paired Comparisons t-tests

## Table 13: Pre/Post Comparisons On Youth By Demographic Traits – Seattle Programs, 2006

| Construct | female | male | ethncty white | ethncty asian | ethncty black | ethncty hispnc | low prior progrm | high prior progrm | outdoor actvty-low | outdoor actvty-high | age 13 | age 16-17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Env Identity | - | - | - | - | + | - | - | 67.62/ 62.40 * | - | - | - | - |
| Self Efficacy – general | - | - | - | 65.42/ 59.86** | + | + | - | - | - | - | - | - |
| Self Efficacy – social | - | - | - | - | + | - | - | - | - | + | - | + |
| Env Concern - biosphere | - | 5.47/ 4.63 ** | - | - | - | - | 5.70/ 4.57 * | - | 5.64/ 4.73 * | + | 5.54/ 4.76 ** | - |
| Env Concern - egotism | + | + | none | + | 5.90/ 6.86 * | + | - | + | + | 5.86/ 6.82 ** | + | + |
| Env Concern - altruism | - | - | - | - | + | - | - | - | 6.13/ 5.48 ** | + | - | - |
| Slf Prcptn – social acceptance | - | - | 4.00/ 3.08 * | + | - | - | 3.22/ 2.67 * | + | - | + | - | + |
| Slf Prcptn – athletic competence | + | + | 3.60/ 3.14 ** | + | + | + | + | - | + | + | + | - |
| Slf Prcptn – physical appearance | + | - | - | none | - | + | + | + | + | + | - | + |
| Slf Prcptn – job competence | - | - | - | + | - | - | - | + | - | + | + | 3.23/ 2.60** |
| Slf Prcptn – behavioral conduct | - | + | - | + | - | + | - | + | + | + | + | + |
| Slf Prcptn – close friendship | + | + | - | + | - | + | + | + | + | 3.34/ 3.74 ** | + | - |
| Slf Prcptn – self worth | - | - | 3.75/ 3.66 ** | + | - | - | - | - | - | - | - | - |
| Civic Action | - | - | - | - | + | 3.78/ 2.78 * | - | - | - | - | - | - |

**Legend:**

1. + is positive change in post-test, - is negative change in post-test
2. p values on paired samples t-tests: * $p \leq .05$, ** $p = >.051$ to 0.1

# 5. GENERAL DISCUSSION AND CONCLUSIONS

Why was there little change detected across the programs? There are several possibilities. As mentioned in the first research phase, participant self-selection may mean that youth with positive traits and positive inclinations pursue activities that reinforce their interests, rather than encourage change. The initial scores of participants were solidly in the "normal" range on the developmental measures. Wilderness programs participation is also typically self-selected, yet significant, positive developmental outcomes have been detected using quantitative measures systems. Many such programs enroll emotionally or behaviorally at-risk youth; such a "baseline" may provide more room for program influence and improvement on developmental scores.

Concern about self-selection has been noted as a confound in research examining the effects of community service and other youth programs (Stukas et al. 1999). It is possible that unexamined factors (such as household or school dynamics) may contribute to any result along with the program experience. Although random assignment might allow for self-selection to be ruled out, research realities prevent such an option.

A prevailing increase in Egotism, with concurrent decreases in Biospheric Concern and Environmental Identity (though not statistically significant) was intriguing and may indicate that youth are initially responding to new information and experience with a higher level of self interest. Recognition of interdependence with and obligation to nature may make it difficult for a person to acknowledge an environmental identity (Clayton 2003). Acknowledging an environmental identity entails a shift in worldview that presents tensions or small crises (e.g. Dunlap & Van Liere 1978, Dunlap et al. 2000). It removes us from the center; the value of things is not based only on their value to us. It limits our control; we have to love what we get rather than create what we want. It means learning to accept responsibility without ownership. An initial response may be to deny environmental identity or to resist considering the needs of other living things in a human-dominated world.

Scores are generally consistent across both summer research phases involving youth, and consistent with use of the measures in other studies. This suggests remarkable developmental stability in a time of life that is popularly believed to be volatile and rapidly changing. Perhaps "deep" change happens, but for most youth it occurs as gradual modification of innate qualities that have strong residual effects.

The literature on Positive Youth Development offers many suggestions about how to encourage young people to attain the best conditions of self and citizenship. Perhaps these principles should be more directly integrated into nature-based youth programs.

How can we promote positive change in young people concerning environment? A secondary, exploratory analysis was done that compared respondent groups across the three phases of the research project (Table 14). Three groups are compared: urban resources professionals, youth who were veterans of Seattle area nature programs, and the national post-test youth. Statistically significant differences are observed, with the professionals showing much higher scores than both sets of youth.

There are many mediating conditions that could explain the differences: maturity, career success providing positive developmental feedback, or again, self-selection. Only a long-term longitudinal study could tease out the causal factors. Nonetheless interview responses tell us that the professionals as young people enjoyed a series of nature experiences, of divergent character and purpose. Rather than focusing on a solitary program experience, program planners may need to form coalitions of organizations that comprehensively design and provide a lifecycle

progression and range of outdoor nature experiences. Perhaps a "nature curriculum" is a pre-school to college range of experiences that respond to the developmental pathways of youth. Just as there is now recognition of multiple intelligences (Gardner 2006), so might there be multiple pathways to nurturing and encouraging greater connectedness to nature as a person transitions from childhood to being an adult. How might the nature programs we studied be "bundled" with other programs to offer a sequence of nature encounters? Despite the limitations of these findings and the narrowness of this sample of adolescents, the results indicate we need better understanding of the role of urban nature-based programs in positive youth development.

**Table 14: Comparisons of Youth, Professionals and 2005 Program Post Test Comparisons**

| Construct | cases pro/yth/ post | pros (2) M | SD | yth (1) M | SD | post yth (3) M | SD | ANOVA mean sq | F | sig. | post hoc comp - sig |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Environmental Concern - biosphere | 26/26/66 | 6.14 | .97 | 5.53 | 1.39 | 4.77 | 1.70 | 19.154 | 8.471 | .000 | 1/3 .091, 2/3 .000 |
| Environmental Concern - egotism | 26/28/70 | 5.77 | 1.14 | 4.91 | 1.49 | 6.55 | .85 | 27.834 | 23.673 | .000 | 1/2 .013, 1/3 .000, 2/3 .007 |
| Environmental Concern - altruism | 26/27/69 | 6.49 | .67 | 5.42 | 1.20 | 5.50 | 1.65 | 10.566 | 5.384 | .006 | 1/2 .018, 2/3 .008 |
| Environmental Identity | 26/31/88 | 78.06 | 8.51 | 72.26 | 8.81 | 62.66 | 10.55 | 2833.160 | 29.120 | .000 | 1/3 .000, 2/3 .000 |

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# 8. APPENDICES

This section contains the following documents:

**A. Literature Review on Positive Youth Development**

**B. Literature Review on Career Choice and Nature**

**C. Literature Review on Youth Development Concepts and Measures**

**D. References List for Literature Reviews**

**E. Parent Consent Form:** This form was provided to partner organizations to record parent consent for study participation by their child. The form was approved by the Human Subjects Review Board of the University of Washington in June 2004.

**F. Youth Assent Form:** As most of the study participants were minors, an assent form was used to record participant consent to participate in the study. The form was approved by the Human Subjects Review Board of the University of Washington in June 2004.

**G. Youth Interview Protocol:** Interviews were conducted with adolescent youth in the Seattle area who had participated in summer urban resources programs in prior years. Using this protocol, EarthCorps interns interviewed youth in-person in Spring 2005.

**H. Youth Interview Survey:** Following the verbal interviews youth were asked to complete a pencil-and-paper survey. These surveys were also administered by EarthCorps interns, and completed in Spring 2005.

**I. Professional Interview Protocol:** Telephone interviews were conducted with minority and/or women urban forestry professionals who are working throughout the United States. Using this protocol, EarthCorps interns interviewed professionals in Spring 2005.

**J. Professional Interview Survey:** Following the verbal interviews professionals were asked to complete an on-line survey. These surveys were also administered by EarthCorps interns, and completed in Spring 2005.

**K. Program Evaluations – Youth Pre/Post Field Survey:** A pencil-and-paper survey was prepared based on prior research, and the results of the youth and professional interviews. The field survey was administered by local program leaders to youth who were participating in urban natural resources programs throughout the United States in Summer 2005. It was also administered to program participants in the Seattle region in Summer 2006.

**L. Procedures Briefing for Surveys Administration:** An introduction to the research project and survey procedures was provided to local program leaders. This tool

encouraged consistency in data collection across multiple un-associated programs in the U.S. the briefing accompanied packages of pencil-and-paper surveys in Summer 2005.

**M. Recruitment Flyer:** This flyer was sent to organizations that were known to have youth programs, as well as those inquiring about participation. The flyer contains an overview of the research purposes, and criteria for program selection.

## Appendix A. Literature on Positive Youth Development

Definitions of what constitutes abnormal or problematic human behavior have occupied philosophers, theologians and mental health professionals through the ages. The issue is particularly thorny in the case of adolescents because there are two fundamentally different views of normal adolescent behavior (Hoge 1999). One is that extreme social conflict and emotional turmoil is unavoidable, a perspective that can be traced back to early psychoanalysts, and has been widely accepted by clinicians, educators and parents.

Models of youth that focus on problems have also held sway in the childcare professions, the mass media, and the public mind (Damon 2004). Typically, adolescence is seen as a period fraught with hazards, and many young people are seen as potential problems that must be straightened out before they can do serious harm to themselves or to others. This problem-centered vision of youth has dominated most of the professional fields charged with raising the young.

Unquestionably, there are some young people who experience minor to severe disruptions in their capacity to function and in their life outlook. And the precursors of many adult disorders can be traced to adolescence. A variety of diagnostic systems have been used to categorize youth problems, and are derived from combinations of theory, clinical judgment, and empirical procedures. Each system proposes indicators, and measures of degree of severity for specified pathologies or dysfunctions. For example, Table A.1. contains an array of psychological disorders that are diagnosed using a widely recognized assessment tool.

**Table A.1: Psychological issues as assessed by the Personality Inventory for Youth (Lacher and Gruber 1995)**

| **Internalizing Disorders** | **Externalizing Disorders** |
|---|---|
| Cognitive Impairment | Impulsivity/Distractibility |
| poor achievement and memory | brashness |
| inadequate abilities | distractibility and over activity |
| learning problems | impulsivity |
| Reality Distortion | Delinquency |
| feelings of alienation | antisocial behavior |
| hallucinations and delusions | dyscontrol |
| Somatic Concern | noncompliance |
| psychosomatic syndrome | Family Dysfunctions |
| muscular tension and anxiety | parent/child conflict |
| preoccupation with disease | parent maladjustment |
| Psychological Discomfort | marital discord |
| fear and worry | **Social Withdrawal** |
| depression | social introversion |
| sleep disturbance | isolation |
| | Social Skill Deficits |
| | limited peer status |
| | conflict with peers |

Note: Internalizing disorders have detrimental consequences primarily for the individual while externalizing disorders impact one's social contacts.

Psychologists have come to understand quite a bit about how people survive and endure under conditions of adversity but have given much less attention to how people flourish in more benign conditions (Seligman & Csikszentmihalyi 2000). Yet contemporary psychology is largely a problem-focused science about healing, based on a disease model of human functioning, rather than an outlook of nurturing. A negative bias can be found lurking almost everywhere in theoretical psychology, and may prevent psychologists from perceiving important human processes, outcomes, and strengths (Sheldon & King 2001).

A second, and more recent perspective is that most adolescents inevitably experience some amount of stress and conflict, but will attain adulthood without serious disruption during their teen years. In recent years the research focus in adolescent and youth development has turned from dysfunction and deficiencies to the pursuit of understanding how young people can positively grow and become more competent. Positive development includes empirical study of ordinary human strengths and virtues, and how these are attained:

> We have a burgeoning field of developmental psychopathology but have a more diffuse body of research on the pathways whereby children and adolescents become motivated, directed, socially competent, compassionate, and psychologically vigorous adults. Corresponding to that, we have numerous research-based programs for youth aimed at curbing drug use, violence, suicide, teen pregnancy, and other problem behaviors, but lack a rigorous applied psychology of how to promote positive youth development (Larson 2000, p.170).

Disagreeable traits are not characteristic of most adolescents, though most will experience some social and emotional turbulence (Hoge 1999). Most youth traverse the teen years without seriously disrupting their own lives or the lives of others around them. In a review of research literature, Elmen and Offer (1993) noted that approximately 20 to 25 percent of adolescents exhibit problems serious enough to require intervention. Rather, they conclude that:

> Persistent low self-esteem, depression, and other disturbances are unusual in adolescence. Most teenagers are well adjusted and cope effectively with the biological, psychological, and social changes that are a part of adolescence. They relate well to their families and peers, and they learn to live within the parameters of their communities. (p. 16).

The emerging field of positive psychology focuses on valued subjective experiences (such as contentment and satisfaction), positive individual traits (such as capacity for love and vocation, and resilience), and about civic contributions (such as responsibility, civility and tolerance). It addresses both the prevention of pathology, as well as how to foster, then amplify, strength and virtue.

Major studies have assessed after-school and community-based programs to better learn how such programs can be designed to successfully to meet young people's developmental needs. Effective youth development programs include intentional delivery of

essential developmental experiences to young people, with the aim being to help youth gain a sense of emotional health, along with the motivation and skill to engage and succeed in school, family and other community settings.

Nature-based activities are notably absent in the literature of positive youth development programming. The potential of nature-based programs for positive youth development remains largely overlooked. Future research could fill this gap by exploring the rich opportunity afforded by nature-based experiences, and integrate community greening into the mainstream community-based youth programs that serve thousands of young people.

## Appendix B. Literature on Career Choice and Nature

### Science Career Precursors

Taking a broad perspective, educators in other science-based professions, such as engineering and medicine, have pursued the issue of career choice. Leslie et al. (1998) conducted an extensive literature review and investigation of college-aged youth in an effort to distinguish females and minorities from majority males in regard to science and engineering study and employment.

Generally, most post-adolescent behaviors in regard to science and engineering can be understood clearly only by reference to earlier life experiences. Choices about majors during postsecondary education and career are formulated by early socialization and behaviors that emerge in the adolescent years. A "life-sequence" approach describes an early-years-to-employment explanation of why women, and to a lesser extent minorities, tend to be underrepresented in particular areas of science, mathematics, and engineering.

Identification of specific causal agents in career choice for science and natural resources professions is not far advanced. Attitudes of parents and other family members, teachers, counselors, and peers are variously known or believed to play some part, but most evidence is impressionistic rather than empirical.

Nonetheless correlational studies have concluded that parental backgrounds are germane to science achievement in their offspring. Women who enter male-dominated fields such as those in the sciences tend to come from intact families, have mothers who work, and have parents who are well educated and consider success to be important (Jackson et al. 1993). Worthley (1992) also reported that science persistence is associated with having highly educated parents. It is likely that parental backgrounds work their effects on their children primarily through demonstrating the feasibility of a science career, so that becoming a scientist is a reasonable expectation (Leslie et al. 1998).

Peer influence also appears to be important, particularly for girls. Adolescence is widely regarded as a critical time for self-identity development, with consequences for academic performance and career preparation. The American Association of University Women (AAUW 1991) found in a national survey that prior to adolescence, girls are "confident, assertive and feel authoritative about themselves (p. 4)." In subsequent years their self-esteem declines dramatically. Of note, adolescent girls rank "being popular" as the most important personal concern, whereas boys list competence and independence. Girls become more other- rather than self-directed. Due to their concern with popularity, girls are more likely to be especially mindful of what their peers think of them.

In the book *Educated in Romance*, Holland and Eisenhart (1990) explain how female self-concept, self-efficacy, classroom experiences, and external goal orientation can come together at the onset of adolescence to deny women access (in a psychological sense) to science professions. In early adolescence there is a clear demarcation between boys and girls with regard to science- and math-related behaviors. Thus begins distinctly different paths of gender-linked personality development that are heavily influenced by relationships with both male and female peers (Leslie et al. 1998). Girls begin to lose interest in science and mathematics in junior high years, and come to view science and mathematics as the domain of boys.

Leslie et al. (1998) identified three major concepts that contribute to choices in math and engineering careers: self concept/self-efficacy, peer influence and goal commitment.[5] Self concept and self-efficacy are developmental attributes that support a young person's ability to articulate goals and commitment to the interim actions necessary to attain vocational or career goals.

**Forestry Careers and Attitudes**

Meanwhile, research on career choice in natural resources and forestry is limited. The few articles that have been published range from more theoretical considerations of developmental traits to a few reports of interventions intended to motivate career choice. In addition, there are studies that have evaluated the youth precursors to environmentally favorable attitudes, values and activity as adults, perhaps yielding insights as to urban forestry career choice.

Kuhns and colleagues conducted an extensive assessment of women and minority urban forestry professionals. The survey of 527 adult professionals provided a demographic profile, including regional U.S. differences and work sector trends (Kuhns et al. 2002).

The survey also explored attitudes and motivations regarding the decision to enter urban forestry professions (Kuhns et al. 2004). "Love of trees and plants" was most often listed as reason by both female and minority professionals, while white males mentioned, "love of the outdoors" most frequently. For all groups nature enjoyment was reported more often than altruistic, income, and family influence motivations for career choice in urban forestry. This is consistent with a study of women entering traditional forestry professions that found that women were heavily motivated by altruism and a love of nature (Teeter et al. 1990).

When queried about satisfactions with the profession, 96% of respondents were satisfied or very satisfied. The "opportunity to make a difference" and a "sense of accomplishment" were the most highly rated motivations, being more important than salary, advancement and job security. Thus, generally, all urban forestry professionals are compelled to enter the profession due to an enjoyment of nature and satisfaction with altruistic or "selfless" work, with some minor variations on these attitudes between white males, females and minority individuals.

Programs have been developed in an effort to expand young people's knowledge about, and level of experience with, natural resources. In one intervention study inner-city middle school students participated in a forestry education program that included activities in the classroom, an urban forest, and a demonstration forest (Broussard et al. 2001). The study objectives were to explore the relationship between students' forest knowledge and attitudes about forest harvest methods. Investigators intended to impact forest attitudes of people who will one day be involved in decisions about land management. Knowledge increased and attitudes shifted (becoming more favorable toward timber harvesting). A demonstration forest program was the most effective educational tool for attitudinal change.

Bowman and Shepard (1985) conducted a resident outdoor experience to introduce selected minority youth to natural resource career opportunities. Two groups of high school students, one minority and one non-minority, participated in three-day programs of intensive forest ecology and management field work. At the end of the experience minority students

[5] p. 244 for description of each if needed

indicated an increased interest in forestry and other natural resource management areas (especially wildlife).

There is concern about the under representation of women and minorities in natural resources generally, including urban forestry. Little is known about the durability of attitude changes resulting from intensive field-based, learning experiences nor the potential influence on career decisions, in either minority or non-minority youth. It is likely that a career choice in urban forestry and/or natural resources is probably the outcome of a combination of broader contextual conditions, such as parent and peer influences, marked by distinct attitudes and values regarding nature that emerge from a variety of sources. It is also probably related to how integral dimensions of human development (such as self concept and efficacy) emerge during adolescence. Across both domains the literature and research on this topic is a patchwork; enough studies have been done to yield insights, but not enough have been done to yield conclusions.

**Nature Influences**

Career choice is rarely a abrupt decision, nor the outcome of a momentary, unique opportunity. For many people, a career is the outcome of a sequence of interests, influences, and educational experiences. Consistent with a "life-sequence" outlook on career choice there have been many studies that have considered the implications of childhood or adolescent experiences of nature on adult behavior and attitudes, so may have implications for career choice.

"Significant Life Experiences" is a body of research that was initiated in 1980 by Tanner to better understand how environmental activists recall being influenced by nature experiences. Chawla (1998) summarized the ensuing research. Her cross-cultural survey of sources of commitment to environmental protection in adults (Chawla 1999) revealed that experiences of natural areas, parental influences and organizations were the most frequently recounted influences. Observations of environmental degradation, education, friends and a sense of social justice were frequently mentioned influences. Books, religious principles, and concern for future generations were mentioned least.

Chawla (1999) further explored the time of life of significant experiences, generating a "life path" model of predominant sources of commitment at different ages. Considering the progression of experiences in childhood, university years and adulthood, two main paths were proposed: concern for environment, and concern for social justice.

Significant life experiences research seeks to connect experiences of early age and environmental action proclivities in adults. Other authors have proposed concepts and measures for how those proclivities may be expressed in an individual's attitudes and values, at any age. Schultz (2001) has conducted studies on the value-based structure of people's environmental attitudes, to better understand the relationships of personal values and environmental concerns. His attitude survey, developed and refined using international samples, measures environmental concerns along three dimensions of value: egoistic, altruistic, and biospheric.

Clayton (2003) has pursued the idea of environmental identity, describing identity as a way of organizing information about the self, which can be done along multiple dimensions according to immediate situations and past experiences. Within psychology social identity has been emphasized and the impact of nonsocial (or non-human objects) on identity has been largely overlooked. Clayton has investigated the role of environmental identity in self-concept, and the connections that people form with specific (pets, trees) and generalized

(mountain formations, seashores) natural objects. Her environmental identity scale, validated across several studies, assesses identity across several dimensions: nature salience, self-identification, ideology, positive emotions and autobiographical memories.

Concerning urban forestry, Kuhns et al. (2004) has provided the only insight on "life sequence" or "life path" nature experiences and career choice. In a related effort, Lohr and colleagues conducted studies that surveyed urban adults about their childhood experiences and current attitudes toward urban trees. Residents of the largest metropolitan areas of the U.S. rated the social, environmental, and practical benefits of trees highly (Lohr and Pearson-Mims 2004). The ability of trees to shade and cool surroundings, and calming effects were the highest-ranked benefits.

Those who strongly agreed with the calming effect of trees in cities were influenced by childhood experience and demographic traits (Lohr and Pearson-Mims 2004). Participation in outdoor activities during childhood was found to be the most important influence in explaining positive adult attitudes toward the calming value of city trees. Additional important variables included parents' feelings about nature, and the gender, age, and ethnicity of the respondents. Income and childhood participation in organized environmental activities were less important.

In addition, those adults who feel that trees have a "particular, personal, symbolic or spiritual meaning" reported a variety of non-wilderness nature experiences as children (Lohr and Pearson-Mims 2002). One or several conditions in combination were correlated with positive attitudes: their homes were near gardens or flower beds (where they harvested things), they had participated in nature or environmental education in elementary school, and/or they visited or played in local parks.

## Appendix C. Youth Development Concepts & Measures

Five constructs of youth positive development were applied in surveys across the phases of the research program. This appendix contains background information for each, including: 1) general conceptual background, 2) prior studies or observations concerning nature experiences, and 3) measurement mechanics. The constructs are:

- Self-Concept
- Self Efficacy
- Environmental Identity
- Environmental Concern
- Civic Engagement

### 1. Self-Concept

Self-concept has been defined in many ways, but refers to one's overall self-evaluation and self-awareness of traits, including behavior, abilities, and body (Harter 1990). Self-esteem is closely related and is one's judgment or acceptance of the perceived self-concept. Both are appraisals, expressed in terms of descriptions, expectations, and/or prescriptions that we attribute to ourselves (Hattie 1992).

Self-concept is both hierarchical and temporal in nature (Shavelson et al. 1976). General self-concept is at the top of the hierarchy; positive, subordinate self-concepts generally contribute to positive general self-concepts. Second-order dimensions can include academic self-concept (constructed of achievement, ability and classroom activity), a social self concept (made up of peer and family interactions), and a presentation self-concept (including confidence and physical appearance). There can be variability in one's estimation of the dimensions of self-concept, as well as the global sense of self (Merrell 2003, Shavelson et al. 1976). For instance, a person may have a negative evaluation of their physical appearance or athletic ability, but still maintain a positive overall view of self.

Self-concept changes over time and is particularly dynamic during adolescence. General or overall self-concept is observable in very young children and is quite stable, but with age becomes situation-specific, reflecting significant changes in life situation (Erikson 1982). Part of a person's identity development is role confusion, as childhood conditions of basic competencies and parental intimacy give way to more complex activity, occupational development, and social dynamics. For instance, verbal and mathematical self-concepts begin to develop by about ages five to eight, and are distinct and separate by late adolescence (Marion and Coladarci 1993).

#### Nature Dynamics

Self-concept is a core construct that has been written about extensively in both the mainstream youth development literature and nature programs studies. During the 1970s, outdoor adventure programs were emerging, and youth benefits outcomes were described in general terms. Enhancement of self-concept eventually became a primary program aim, and the research evidence has been generally supportive.

Early studies were exploratory. An evaluation of the 1971 Youth Conservation Corps pilot program was one of the earlier studies to explore self-concept (Dickerson 1977). Four

dimensions of self-concept were empirically derived: personal worth, adequacy, social skills with adults, and social skills with peers. The evaluation of the program found no changes in self-concept, but factor analysis identified significant differences of self-concept dimensions, demographics and program activities.

An early literature review of adventure-based programs for at-risk youth noted that a major goal of many nature-based adventure programming is enhancement of participants' self-concept or self-esteem (Moote and Wodarski 1997). Many of the reviewed studies indicated that participation in an adventure based program yielded positive self-concept/self-esteem outcomes.

Other efforts have included a three-study evaluation of Outward Bound programs in Australia (Marsh et al. 1986a, 1986b), finding changes in self-concept that were aligned with program goals, and that changes were sustained 18 months after program completion. Later Hattie and coauthors (1997) observed that, based on various summaries of research into the effects of adventure programs, there is some justification, at least in broad terms, for claims of self-concept development effects. They found that the greatest effects for adventure programs in the self-concept domain were for independence, confidence, self-efficacy, and self-understandings, and such responses were further enhanced during follow-up periods.

Based on consistently positive findings Schreyer et al. (1990) argued for the benefit of on-going and continued wilderness participation in self-concept formation, enhancement and maintenance. The context of wilderness favors self-concept expression, in providing opportunity structures, the use of symbols, and structured social interactions. Is it possible to create similar enhancing conditions in urban nature settings? Few programs have addressed this possibility.

Measures

Susan Harter developed self-perception profiles that encompass theories of self-concept formation across the lifecycle, and include versions for children, adolescents, college students, and adults. These self-perception profiles occupy a central position in psychology and have been widely used in research. The Self-Perception Profile for Adolescents (Harter 1988) is a 45-item self-report scale that assesses nine dimensions of self-concept and self-esteem. Seven subscales were included in the present study:[6]

- Global Self-Worth: extent to which adolescents like themselves are happy with the way they are thus is an overall judgment of one's worth as a person.
- Social Acceptance: degree to which adolescents are accepted by peers, feel popular, have a lot of friends, and feel that they are easy to like.
- Athletic Competence: athletic ability and competence in sports (e.g., feeling that they are good at sports and other athletic activities).
- Physical Appearance: degree to which adolescents are happy with the way they look, like their body, and feel that they are good-looking.
- Job Competence: extent to which adolescents feel they have job skills, are ready to do well at part-time jobs, and feel that they are doing well at the jobs they have.

[6] Scholastic Competence and Romantic Appeal were not used as they were not consistent with the context of the study

- Behavioral Conduct: degree to which adolescents like the way they behave, do the right thing, act the way they are supposed to, and avoid getting into trouble.
- Close Friendship: adolescents' ability to make close friends, with whom they can share personal thoughts and secrets.

Each concept was represented in surveys by 5 verbal items, each with a value of 1 to 4 (see Appendix K, Part 4). Scores are expressed as means across five items, thus subscale scores are based on adolescents' self-perceived competencies. Higher scores represent more positive self-perceptions. High mean internal consistency reliability scores on the items (during scale development) indicate that subscale items are consistent with the constructs.

**2. Self Efficacy**

Self-efficacy refers to a belief in one's abilities to perform a given or chosen behavior. The will power to persevere when met with obstacles is impacted by the person's confidence in achieving a behavior (Bandura 1982). Self-efficacy, or the power of believing you can, is an important ingredient for the success of individuals, organizations, even societies. Generally, a sense of control over our behavior, environment and our own thoughts and feelings contribute to happiness and a sense of purpose (Bandura 1997).

The construct of self-efficacy differs from the colloquial term "confidence." Confidence is a nondescript term that refers to strength of belief but does not necessarily specify what the certainty is about. One can be supremely confident that he will fail at an endeavor, but perceived self-efficacy refers to belief in one's agentive capabilities, that one can produce given levels of attainment. A self-efficacy assessment, therefore, includes both an affirmation of a capability level and the strength of that belief.

Self-efficacy is related to other behaviors or traits (such as self-esteem, optimism or hope) but is distinct in being a set of *beliefs* about "the ability to coordinate skills and abilities to attain desired goals in particular domains and circumstances" (Maddux 2002, p. 278). A global sense of self-efficacy may be made up of multiple sub-domains (Bandura 1997), such as cognitive, health, clinical, athletic, organizational, and collective (including socio-cultural and political).

A person's belief in her capability to produce desired effects by her own actions, is an important determinant of behavior choice, and level of perseverance in the face of challenges (Maddux 2002). One's self-efficacy determines, in part, whether one decides to cope with adversity, to what degree, and how persistently. One's "strength of conviction" will affect willingness to see a task or goal to completion, and even one's decision to initiate an effort. Expectations of the probability of success in a given endeavor are important in formulating behavior (Bandura 1977). Those who expect success will persevere; disconfirming experiences weakens expectations Bandura (1977), and these outcomes underpin future behavior choices.

It is likely that development of self-efficacy is influenced by two primary factors. First, the capacity for symbolic thought is important, particularly the ability to understand cause-and-effect relationships between events, and the abilities of self-observation and self-regulation. Young people must recognize that one event causes or is related to another, including one's behavior and choices. Second, efficacy beliefs arise from learning that environments are responsive, and that one's actions can manipulate or alter a situation.

Realization that change is a consequence of human effort, and that one is personally capable of being an agent of change culminates in a sense of self-efficacy.

The context or circumstances of one's life can contribute to the development of self-efficacy. It is fostered in a person by both observing and directly experiencing the results of causal actions. Comprehending one's ability to cause change involves being able to recognize subtasks, being able to recognize delayed effects, and understanding the range of one's capabilities to achieve desired actions. Observing and integrating performances that are modeled by other people (such as respected adults) can instill understanding of both the larger sense of agency and associated skills (Bandura 1997).

Nature Dynamics

Bandura (1977, 1982, 1997) offers the most extensive theory with regard to activity and self-efficacy. A sense of efficacy can be derived from past failures and/or accomplishment. Feelings of accomplishment or failure are not isolated to specific events or activities but can translate to other experiences. Self-efficacy is learned from our prior experiences, is incorporated into self-beliefs, and is applied to achieve future tasks. Positive judgments of self promote active involvement in activities and contribute to the growth of competency. If one judges him/herself as inefficacious, s/he perceives potential problems and difficulties as more formidable than they really are.

Theory about self-efficacy largely addresses social interactions, particularly parental response, and has generally failed to address the role of the physical environment in development of self-efficacy. Landscape oriented skill achievement may contribute to more positive self judgment of efficacy. Program assessments often include skill achievement of participants. Nature-based youth programs are usually hands-on, participatory, and require acquisition of new skills to complete planned activities. Some programs require skills for scientific inquiry and analysis, skills in outdoor survival, construction skills (such as trail building), communication skills, or adventure skills such as rock climbing or rappelling. New skill acquisition is intended to expand adventure or work capabilities directly, and promote better self-concept and self-efficacy indirectly.

Learning about ourselves involves evaluating the "differential consequences" of our choices of actions (Bandura 1977). A person's performance-based experiences are variously self initiated and evaluated. There are four elements of the learning process: 1) performance accomplishment which is based on mastery and is quite important, 2) vicarious experiences which involves making social comparisons, 3) verbal persuasion which is widely used but has little effect, and 4) emotional arousal which potentially heightens awareness or perception of situations.

Kurt Hahn, founder of Outward Bound, was an influential proponent of outdoor/adventure education (Baldwin et al. 1976). Adventure oriented experiential education provides educational environments that engage the total person (emotional, physical, and social). Typically a series of intense experiences in a natural setting that entail increasingly complex and difficult challenges. Mastery or achievement of a task by the individual enables a sense of achievement concerning subsequent challenges. Transference, or the application of what the participant learned in the wilderness program to new challenges beyond the program is a significant purpose of adventure education (Gass 1993).

Paxton and McAvoy (2000) explored the effect of participation in wilderness-based adventure programs and self-efficacy of youth. Significant and enduring increases in

participants' self-efficacy were detected. Not only did self-efficacy levels increase during the 21-day wilderness course, but they also improved up to six months following. Qualitative assessments indicated that increased self-efficacy was being transferred into the personal, social and work spheres of participants' lives. It was reported that experiences in the wilderness program resulted in increased feelings of competence, acceptance of failure as a learning opportunity and personal control. These judgments were strongly stated as young people described a new sense of confidence, greater capability to take on difficult tasks, and perseverance on a task even when facing adversity.

Measures

Existing scales to measure self-efficacy use indirect measurement of perceived level and strength of self-concept and self-actualization. Some measure general self-efficacy; others test specific domains or challenges, such as anxiety disorders or quitting smoking.

The second section of the surveys, *My Abilities*, contained measures of general self-efficacy. In Phase I an instrument developed by Cowen et al. (1991) was used. The 20-item Perceived Self-Efficacy Scale measures confidence with which one can deal effectively with everyday problems and challenges. Sub factors are confidence to deal with new experiences, difficult situations, and problems with people.

It was found that youth had difficulty responding to the question format, so the Self-Efficacy Scale by Sherer et al. (1982) was used instead (Appendix K, Part 2). It contains 23 verbal items (plus 7 filler items). It is based on Bandura's theoretical work and questions measure generalized personal expectation of mastery across educational, social and vocational of situations. It asks respondents to indicate how certain they are about their capabilities to attempt new activities and persevere through difficult activities.

Two subscales address General Self-Efficacy (having two components: initiation/persistence and efficacy in the face of adversity) and Social Self-Efficacy. The self-rating scale is from 1=disagree strongly to 5=agree strongly. Scores are tallied across items providing a high score of 85 for General, and 30 for Social. The Self-Efficacy Scale demonstrates good internal consistency, criterion-related validity, and construct validity (Corcoran and Fischer 1987). Adolescent scores on the Self-Efficacy Scale also correlate significantly with measures of general well-being (Ehrenberg et al. 1991).

**3. Environmental Identity**

Identity is a way of organizing information about the self, which can be done along multiple dimensions. (Clayton 2003). Each person has multiple identities for each individual, based on immediate situations and past experiences. People use such perceptions to generate a self-concept. Identities often originate within a social context that gives meaning to encounters with people and environments. Identities shape how we perceive and act toward the world, and are an important part of who we are.

Identity can be a strong influence on how people think about themselves. An identity can be very individualistic (such as being a musician), and are generated around perceptions of innate abilities or features. Collective identities, on the other hand (such as a national or ethnic identity) provide a sense of connection, of being part of a larger whole, and are based in part on recognition of the similarity between self and others. In either case the self references others, individuals or groups, to aid self-definition and understanding.

In life an identity can be both a product and a force (Rosenberg 1981) in being an assortment of beliefs and attitudes about the self, and a motivator for certain ways of interacting with the world based on those commitments. A strong identity along any dimension (environment, arts, science, social group etc.) can guide personal, social, and political behavior.

Nature Dynamics

Environmental identity addresses the potential that the natural environment is a rich source of self-relevant beliefs and actions. Within psychology social identity has been emphasized and the impact of nonsocial (or non-human objects) on identity has been largely overlooked. Clayton has investigated the role of environmental identity in self-concept, and the connections that people form with specific (pets, trees) and generalized (mountain formations, seashores) natural objects.

Many people are aware that an important aspect of their identity concerns their ties to the natural world. They experience a sense of connection to some part of the natural environment based on history, emotional attachment, and/or a sense of similarity. These connections to natural objects may range in scale from an individual animal to a landscape setting such as a mountain. But it is important to note that empirical research has found the valued nature doesn't have to be "out there" beyond the places of daily living (Kaplan and Kaplan 1989). A small site, or even a single plant have been found to elicit strong feelings and commitment.

Connections with natural objects or settings transcend the political self. Even those people who don't think of themselves of environmentalists often express love for some aspect of nature. For most people there is at least some value to experiences with the natural environment that cannot be accounted for by the conventional motivators of money, sex, food and social status.

There are certain conditions of nature that may encourage a strong and positive sense of self (Clayton 2003). Three qualities are important to strong self-identity: autonomy or self-direction, relatedness or connection, and competence (Ryan and Deci 2000). Autonomy is possible in natural settings as one can observe the consequence of action, without social restrictions. Relatedness comes from the opportunity to perceive being part of a larger system. Competence can come from a feeling of mastery of the skills or actions needed to get along in a natural setting.

Nature-based youth activities are often intended and designed to change participants' levels of eco-literacy or to nurture an ecological identity (Thomashow 1995, Clayton 2003). A program may intend to change how youth value wilderness (Vogl and Vogl 1990), urban green spaces, or overall attitudes toward natural resources management (Broussard et al. 2001). Attitudes and values, assumed to develop during the course of a program, may be measured by observing behaviors that are judged to be indicative (Bennett 1974). For instance, participants in 3 to 4 week long programs studied by Kellert and Derr (1998) showed long-term positive changes in behaviors that demonstrated an increase in ecological literacy and identity.

Measures

Given current concerns about the earth's ecosystems and interest in environmentally sustainable behaviors, this research examined environmental identity as an important dynamic of adolescent development. The first section of the survey (Appendix K), Nature and Me, presented a 24-item self-report scale for assessing individual differences in environmental identity (Clayton 2003).

The structure of the scale was based on four theoretical dimensions of self-identification:

- *salience*, or the memory of nature in personal autobiography
- *self-identification* or the extent to which nature contributes to a collective that one identifies with
- agreement with *ideology* of environmental education and sustainable lifestyles,
- and positive *emotion* from the enjoyment of nature.

In the original instrument items are rated on a scale of 1=strongly disagree to 8=strongly agree. An individual's score is tallied across all items, providing a possible range from 24 to 192, with means in prior studies at the mid 120s. In pre-testing it was found that youth had difficulty responding to the full rating range, so responses were reduced to a scale of 4. The rating issues may be due to younger age as the instrument was initially developed and tested with college students. In this study, then, the potential score range for each participant was 24 to 96. In addition, some of the instrument items favored rural nature contexts. Such questions were slightly modified to reflect the urban conditions of study participants.

The scale has been used in several studies and has proven to have good internal reliability (Cronbach's alpha of 0.90 or more). Women tend to score slightly higher than men, but the differences are usually not statistically significant.

**4. Environmental Concern**

As environmental conditions decline, more people in our nation and around the world are expressing concern for environmental issues. National surveys in the U.S. and other countries list environmental problems as foremost among societal concerns, with particular interest in climate change.

Social scientists have coined multiple terms to designate the range of psychological associations that people have with environment (Schulz and Zelezny 1998). Environmental concern refers to the affect associated with environmental problems and the term environmental attitude to refer to the collection of beliefs, affect, and behavioral intentions a person holds regarding environmentally related activities or issues. From this perspective, environmental concern is one aspect of an environmental attitude, and may be a precursor of such attitude in adolescence.

Social scientists have also long been interested in being able to measure psychological associations. In the 1970s a spate of scales were designed to measure general concern for and knowledge about environmental issues. Many of these were criticized for their lack of a theory foundation (Stern & Oskamp 1987).

More recent theory based scales argue that attitudes of concern about environmental issues are based on a person's more general set of values. Stern and Dietz (1994) proposed a

value-basis theory, maintaining that environmental attitudes and behaviors are derived from an awareness of the harmful consequences to valued objects. Valued objects are oriented around three basic sources: self, other people, or all living things. Egoistic concerns focus on the individual. People with egoistic environmental attitudes are concerned about the environment, but their concern is at a personal level. For example, those who hold egoistic environmental attitudes would be concerned about air pollution because of the effects it may have on their health. Social-altruistic attitudes describe an overall concern for all people. People with social-altruistic environmental attitudes care about environmental problems because the problems affect other people. Biospheric attitudes are based on all living species. Overall, each of the three types of attitudes implies concerns for the environment, but each is based on different underlying values.

Of course there are individual differences in the degree to which people include nature within their cognitive representations of self (Schultz 2000), connecting concern to identity. For individuals with a high degree of inclusion, self and nature are interconnected, and aspects of nature have inherent value. At low levels of inclusion, self and nature are separate, and nature is valued only to the extent that it affects self. Values with a focus of concern beyond a person's immediate social circle (called self-transcendent or altruistic) reflect a greater degree of inclusion—a valuing of goals and objects that are not directly tied to self-interest (such as equality, unity with nature, broad-mindedness, a world at peace). In contrast, self-enhancement values focus on goals and objects that are directly related to self benefit (success, social power, wealth).

More recently Schultz (2001) has adjusted a scale to distinguish the three clusters of egoism, biosphere, and altruism, and was used in this study. It is probable that the link between values of self, society and environmental concern are moderated by an awareness of the harmful consequences to valued objects. Understandings of the outcomes and impacts of environmental damage that extend to people and places are expressed in personal values. Testing along the three domains often results in clustering of ego-based attitudes, while altruistic and biospheric values often mix together into generalized self-transcendent value cluster(s) (Stern et al. 1995). Transcendent values are generally stronger among people who engage in pro-environmental activities.

Adolescence is a time when attitudes, beliefs and values are composed, tested, and, if adopted, integrated into the emerging self. Emergent environmental values may result from experiences that are repeated, vivid, perceived as being highly salient, and are socially reinforced (parents, trusted adults, role of peers). It is important that formative environmental experiences are a part of this dynamic time within and individual's lifecycle.

Measures

Part Three of the Phase II and III surveys (Appendix K), *My Concern for the Environment*, contained the Environmental Motives Scale (Schultz 2001). It is a 12 item rating scale used to distinguish a person's environmental concerns along the dimensions of egotism, altruism, and biospherism. Respondents rate each item on a scale of 1=not important to 7=supreme importance, and means are calculated across 4 items for each dimension.

The basic three-factor structure has been found in several U.S. samples (among both college students and the general public) as well as in cross-cultural research with samples from more than 14 countries around the world (Schultz & Zelezny 1998). The items represent 3 conceptual categories of 4 items each: biosphere, egotism, and altruism.

Biosphere items present very broad classes of living things, such as plants and birds. Egotism is represented by brief statements of self interest, such as "my lifestyle" or "my future." Altruism represents concerns about broader societal consequences, and those of the future, such as "all people" and "future generations."

The scale was has been validated using respondent correlations and confirmatory analysis of multiple instruments of environmental paradigm, interpersonal reactions, social value orientation and pro-environmental behavior. The scale has not been directly evaluated for use with children and youth. Nonetheless, results strongly supported the notion that values underlie environmental concerns and environmental worldview, and that concerns are measurable.

### 5. Civic Engagement

Background

Democracy is rooted in the notion that the rights and responsibilities of citizenship are instilled through a socialization process in which interest and participation in the civic life of the community and nation are central. Civic development has traditionally been represented by civics as knowledge, such as how a bill becomes a law or knowing the amendments to the constitution. Civic development in adolescents is now framed more broadly to include concerns regarding social issues, intentions to vote in future elections, future intentions to be involved in unconventional political activities, and whether they intend to perform volunteer service as adults.

Each of these aspects of citizenship is important in adolescents' current views of themselves in relation to society and how they envision themselves as active participants in the future (Verba et al. 1995, Youniss et al. 1997). The literature on civic development points to several factors that shape a socialization process. These include family background, peer and social groups, and extracurricular and school involvement. Other socio-contextual factors, such as the location and type of community where adolescents grow up and the influence of mass media, are also considered to be important in this process (Torney-Purta et al. 1999).

Recently adolescent participation in community service has received attention as a potential facilitator of civic engagement. It has been theorized that service enhances fundamental aspects of citizenship by connecting adolescents to society, enhancing their awareness of social and political issues, and stimulating their sense of social responsibility and agency (Eyler & Giles 1999, Youniss et al. 1997). A number of studies show that students who participate in service learning have a greater awareness of community needs, a stronger sense of civic responsibility, and more concern for social change than non-participants (Morgan & Streb 2001). On a personal level volunteers in community service are healthier, less likely to be delinquent, perform better in school, and have a stronger sense of civic identity than those who do not (Planty et al. 2006).

There is a clear theoretical basis for understanding service as a vehicle for enhancing identity development (Youniss & Yates, 1997), which may in turn compel service. Social cause types of service can provide adolescents with challenging experiences by exposing them to unfamiliar people and compelling social problems. It may also put them in direct contact with adults and organizations that espouse moral-political philosophies about social justice. Within lie the fundamental elements that Erikson (1968) described as essential for

supporting adolescents as they construct their identities. It is not incidental that a set of longitudinal studies support this view, having found that youth who do service in support of moral-political causes continue to be civically engaged as adults (Verba et al. 1995, Youniss et al. 1997).

Modeling in community service is important. Service opportunities are often done within the context of community organizations that symbolically represent explicit stances toward improving society. These organizations, such as churches or cause-based nonprofit groups, expose youth to definite political-moral rationales for social action. Youth encounter these beliefs as they participate alongside adults who represent the organizations and can espouse their basic philosophies. Students who do service in such situations are provided with clear ideological positions on which they can reflect (Eyler & Giles 1999). This provides ready-made positions for interpreting their service experience, allowing them to visualize themselves as actors within larger collective movements (Erikson, 1968; Youniss & Yates 1997). Youth can then see themselves as engaged in social causes and even as political actors who could take active stands for political-moral reasons.

Encouraging youth participation in community service has long been a priority of national policy makers—from President Kennedy's Peace Corps, to AmeriCorps. The hope of these initiatives was that encouraging youth to get involved in their communities (and sometimes beyond) and by providing them with outlets to do so would instill a sense of civic responsibility, reduce apathy and cynicism, and promote a lifelong commitment to service. Although studies show positive outcomes for youth who engage in community service, it is unclear whether this altruistic behavior continues into young adulthood, especially for those for whom the participation was involuntary. Does the patterning of volunteer work change from high school through young adulthood? To what degree is service activity in youth associated with civic engagement at different phases of adulthood? To what extent do intentions that emerge in youth have an influence on adult activity?

Nature Dynamics

While civic engagement has become an emphatic concern of mainstream youth development psychology (Lerner et al. 2000, Damon 2004), studies of nature-based program for youth have largely not yet addressed civic engagement.

Related purposes are at the core of many programs. For instance, leadership development is a goal of many nature-based youth programs. Nature programs provide unique opportunities for leadership skills enhancement. An individual is usually placed in unique circumstances with a group of people that extend beyond their customary friendship and peer associations. Experiential learning (such as mountaineering or a ropes course) must include team-building goals and activities. Activities are often dependent on group participation and rely heavily on cooperation and collaboration. Participants must learn how to work together in teams and their success depends on positive group dynamics.

There are other related findings. An early research review addressing the development of social skills found that there were substantial positive changes in interpersonal-social relationships after participating in an outdoor education activity (Crompton and Sellar 1981). Recent research has continued to link youth participation in nature-based activities and social development. Garst and Scheider (2001) measured social acceptance and found that youth showed increases in social acceptance immediately after the

activity, although a decrease in a four-month post-test did raise concerns about outcomes durability.

The strength and vitality of communities is dependent on the continued contributions of individuals and civic associations, and there has been concern that young people may not have adequate access to skill-building and adult modeling about good citizenship. There is little understanding of the potential transference of leadership, group action skills, and social acceptance from wilderness program settings to the neighborhoods and communities to which youth return.

Nature programs that are situated in more urban settings, such as open space restoration projects, often entail extensive collaboration and coordination with public agencies, neighborhood groups, and possibly the business sector. Such experiences present rich opportunities for research. Little is known about either the degree to which community engagement continues within a project setting following project end, nor the degree to which youth may transfer their community involvement skills to new settings in their school or other communities (e.g. Riggs and Greenburg 2004).

Measures

Part Five of the youth program surveys, entitled *Me and My Community* (Appendix K) contained an instrument to measure civic engagement. The Civic Action scale measures intentions to become involved in the future in community service or action.

The Civic Action scale is one of six subscales of the Civic Attitude and Skills Questionnaire, (CASQ) with other subscales being: Interpersonal and Problem-Solving Skills, Political Awareness, Leadership Skills, Social Justice Attitudes, and Diversity Attitudes (Moely et al. 2002). Items are similar to those used for the Civic Responsibility Scale (Astin & Sax 1998), though it is focused more specifically on involvement in community programs and helping others.

Respondents indicate their agreement or disagreement on a 5-point response range for each of 8 items. Participants indicate degree of agreement with each item by marking a scale from 1 (completely disagree) to 5 (agree completely). Respondent scores are expressed as a mean across all items.

Psychometric evaluations have been done on the Civic Responsibility Scale (Bringle et al. 2004). Tests of reliability and validity have been conducted, primarily with college aged students. Evaluations of different groups with the Civic Action scale have shown that service learning students do significantly increase attitudes about civic action compared to traditional students that more time spent in community service is associated with higher scores, and that female students scored higher than male students.

**6. Demographics**

Part Six of the Phase I and II surveys, Questions About You, requested demographic information about individual traits and prior nature experience (Appendix K). Core questions asked about age, gender, zip code of address, ethnicity, and grade level in school. Since youth were judged to not be able (or willing) to share reliable information about income, one question asked whether the respondent's household was receiving public assistance.

A couple of questions were to be used to test for associations between prior experience and developmental benefits. One question asked about the number of times the respondent had participated in prior nature service programs. Another requested information

about prior nature activities, including passive and active pursuits, as well as more formal versus self-directed activities.

For Phase II research, information about the program type - including aspects of duration, day versus overnight, and major tasks – was collected from program sponsors.

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**Appendix E. Parent Consent Form**

**YOUR ORGANIZATION NAME**

**RESEARCH ON YOUTH AND OUTDOOR WORK/SERVICE EXPERIENCES**

# PARENT/GUARDIAN CONSENT FORM

**Statement About the Research Project**

We are asking your child to be in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether or not your child should be in the study. Please read the form carefully. You may ask questions about the purpose of the research, what we would ask your child to do, the possible risks and benefits, your child's rights as a volunteer, and anything else about the research on this form that is not clear. When all your questions have been answered, you can decide if your child should be in the study or not. This process is called 'informed consent.'

**Research Team:**

EarthCorps (Seattle, WA) is a non-profit organization dedicated to nature restoration and youth development, and is the project sponsor. Su Thieda is the project coordinator for EarthCorps and can be reached at su@earthcorps.org or 206-391-3640. Dr. Kathleen Wolf, Research Social Scientist at the University of Washington (Seattle) prepared the research materials and can be contacted at 206-616-5758 or kwolf@u.washington.edu. **YOUR ORGANIZATION NAME** is partnering on the project and will help conduct the research in **YOUR CITY, and can be reached at e-mail/phone**.

## PURPOSE AND BENEFITS

We want to know more about the possible benefits that youth gain from being involved in nature-based work experiences. We want to learn if a young person's personal opinions about self-concept, self-esteem, their ability t get things done, and their environmental values change due to working on nature projects. Your child may not directly benefit from taking part in this research. However, we hope that the results of the study can improve nature-based programs for youth in the future.

## PROCEDURES

We would like to evaluate the youth who participate in **PROGRAM NAME**. We will do two surveys (containing measures of attitudes) in the field work settings. If you choose to let your child be in this study, he or she will be asked complete the two surveys – one each at the beginning and end of the youth program. Each will be about 20 minutes long. The surveys are identical, and will ask your child to rate short questions about his or her self-perceptions and then some questions about his or her connection to the environment. Examples of questions or statements include, "Some teenagers find it hard to make friends," and "Some

teenagers are often not happy with themselves," or "Doing things for the environment is important to me."

Your child may choose not to answer any question. There will be no information in the survey that identifies your child directly. Surveys will be identified only by the work project location. Only the project scientist will have access to the survey records.

If you wish to review the measures survey you can contact Dr. Kathy Wolf at 206-780-3619 or kwolf@u.washington.edu and she will send a copy.

## RISKS, STRESS OR DISCOMFORT

Some people are a little uncomfortable when they complete questions that describe themselves. Your child can stop doing the survey at any time. Some people feel that providing information for research is an invasion of privacy. We will protect your child's privacy by having no identity information on the surveys.

## OTHER INFORMATION

Being in this study is voluntary. If your child chooses not to participate, then an alternative activity will be provided. Your child can refuse to respond to any or all questions. All information your child provides is confidential. There will be no link between your child's responses and your child's name. All study records will be kept in a secured location. Only the study scientist will have access to the records. If I results of this study are published, no child's name will be used.

**Parent/Guardian Consent**

Please indicate below whether you give your child permission to participate in the research activities:

❑ Yes ❑ No I give my permission for my child to be given surveys at both the beginning and the end of the **PROGRAM NAME**.

The study has been explained to me. I have had an opportunity to ask questions. If I have questions later on about the research I can ask a representative of EarthCorps or the project scientist.

Signature of parent/guardian Printed name Date

Your child's name, printed: _____

Copies to: EarthCorps

**Appendix F. Youth Assent Form**

**YOUR ORGANIZATION NAME**

**RESEARCH ON YOUTH AND OUTDOOR WORK/SERVICE EXPERIENCES**

# YOUTH ASSENT FORM

**Research Team:**
EarthCorps (Seattle, WA) is a non-profit organization dedicated to nature restoration and youth development, and is the project sponsor. Su Thieda is a project coordinator for EarthCorps and can be reached at su@earthcorps.org or 206-391-3640. **YOUR ORGANIZATION NAME** is partnering on the project and will help conduct the research in **YOUR CITY, and can be reached at e-mail/phone**.

**Statement about the Research Project**

The reasons for our study: We want to learn more about the possible benefits that young people gain from being involved in nature-based work and service experiences. We want to see if your thoughts about your personality, your ability to get things done, and your values about the environment change when you work on nature projects.

What we will do: We will ask you to do a survey two times. Near the beginning of the project we will ask you and all of the other people in the project team to complete a survey. The survey has six parts. Some questions are about what you think of yourself. Other questions are about the environment. Here are some of the questions or statements, "Some teenagers find it hard to make friends," and "Some teenagers are often not happy with themselves," or "Doing things for the environment is important to me."

It will take about 20 minutes to fill out a survey.

Near the end of the project we will ask you to fill out the same survey. We want to see if being in **YOUR ORGANIZATION'S** project changes how you see things. You will turn in all of the papers to the research team. There are no right or wrong answers. No other people in your group, or **ORGANIZATION** will ever see your survey or your answers to the questions. The surveys will be reviewed at the University of Washington in Seattle.

Your part: You can choose whether or not you would like to be a part of this study. If you choose not to participate, you can do another activity with **ORGANIZATION** staff during the study times. You can ask questions about the research at any time. If you do not want to tell us about yourself or your thoughts, you don't have to. If you are ever uncomfortable with the written questions all you have to do is let us know. Being part of this study will not affect any other part of your participation in the **PROGRAM/PROJECT NAME**. You can

change your mind about being in the study at any time. We'll be very careful to protect your privacy and the privacy of other team members.

**Project Participant's Statement**

The reasons for this study have been explained to me. I understand what we are going to do, and I would like to be a part of this study. I can ask questions about the study now or later. I know that I will fill out two surveys. I know that if I have more questions, I can ask **CONTACT IN YOUR ORGANIZATION (e-mail, voice mail)**. I also know that if I have more general questions about the study I can contact Su Thieda at EarthCorps (su@earthcorps.org or 206-391-3640).

❑ Yes ❑ No I agree to participate in filling out surveys at both the beginning and the end of my project.

Signature of participant Printed name Date

Copies to: Participant
**YOUR ORGANIZATION**

**Appendix G. Youth Interview Protocol**

**Appendix H. Youth Interview Survey**

**Appendix I. Professional Interview Protocol**

**Appendix J. Professional Interview Survey**

**Appendix K. Program Evaluations-Youth Pre/Post Field Survey**

**Appendix L. Procedures Briefing for Surveys Administration**

**Appendix M. Recruitment Flyer**