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VALUING URBAN NON-TIMBER FOREST PRODUCTS

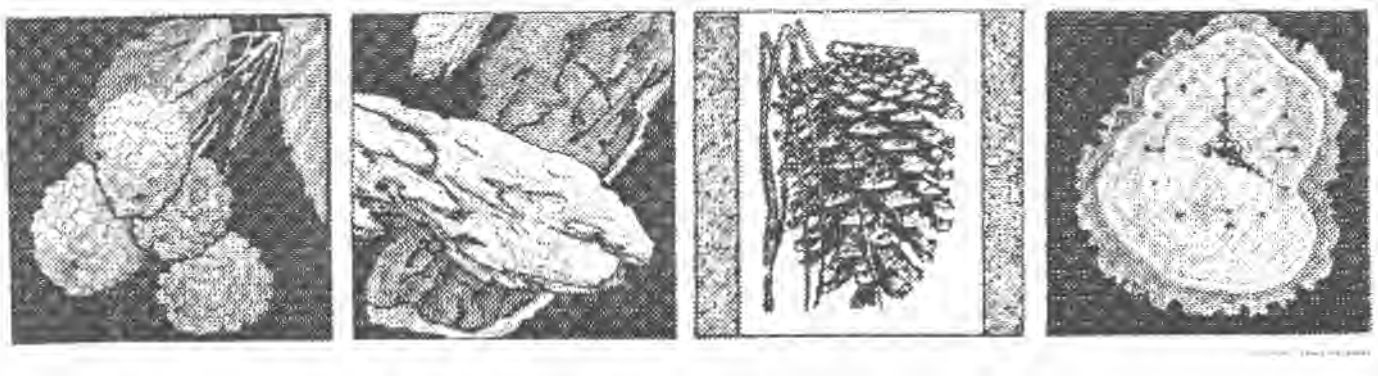
ABSTRACT
Understanding and marketing the full value of products from the urban forest, including non-timber forest products (such as nuts, fruits, saps, bark, florins, mushrooms, etc.) is critical for developing and sustaining healthy urban and community forests and forest related micro-enterprise opportunities. Yet the uses, values and potential markets of these products from the Urban Forest have not been quantified or even explored. Our initial investigations in Baltimore, Maryland reveal that numerous NTFPs are currently collected, used and even sold. Moreover, the use of Urban NTFPs often involves economically disadvantaged and minority groups. NTFPs have important subsistence, economic and cultural values, and they deserve further study.

The Proposed Objectives of this Project are to:
- Identify and document current and potential urban NTFPs
- Quantify the current and potential values of various urban NTFPs in Baltimore, MD
- Conduct an initial investigation of potential micro-enterprise opportunities involving NTFPs
- Document and communicate these NTFP uses and values nationally
- Begin to explore urban NTFP issues such as land tenure, collection permits, contributions to household sustenance, market potential and cultural meanings to various ethnic groups.

This project will have a significant impact by broadening our understanding of the - as yet unexplored - economic, cultural and subsistence values, uses and issues surrounding these urban forest products. Our results will be communicated, disseminated and debated on a national level, and they will hopefully lead to further micro-enterprise study and development in this arena.

Community Resources and our assembled team of partners bring the necessary administrative, managerial, practical and applied research skills to complete this project both efficiently and at the highest quality. Our staff combines researchers and practitioners who have completed notable NTFP research internationally. Partner organizations include the Baltimore City Section of Forestry, Parks 8z. People Foundation, Yale School of Forestry and Environmental Studies, the USDA Forest Service, and local community groups.

Applicant:	Community Resources
Project:	Valuing Urban Non-Timber Forest Products
Total Cost:	$83,950
NUCFAC Request:	$41,975



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Why Value Urban Non-Timber Forest Products?

Understanding and marketing the full value of the urban forest is a critical part of our efforts to develop and sustain healthy urban and community forests. While researchers and practitioners are making strides in describing and quantifying the "benefits" and "services" that urban forests provide, we have yet to explore the full range of "goods" that can be sustainably harvested from the urban forest. These goods include both timber (fire wood, specialty woods, wood waste, etc.) and non-timber products (fruits, nuts, saps, oils, mushrooms, florals, medicinals, etc.). Such Non-Timber Forest Products not only represent a potential additional value of the urban forest, but they are also products that can be sustainably harvested, and they are goods that often hold special economic and cultural meanings for many different groups, especially lower-income and minority residents. This project to identify and value Urban Non-Timber Forest Products will begin to explore some of these potentially important products and markets in a way that has not yet been done for the urban forest.

The Importance of Non-Timber Forest Products

During only the past five years, Non-Timber Forest Products (NTFPs) have become increasingly recognized for the important cultural, subsistence and market values that they add to the overall value of rural forests and individual households worldwide, and for the micro-enterprise opportunities that they represent. Indeed, our initial literature search resulted in 333 separate articles or books discussing the values, markets and issues surrounding NTFPs, nearly all published since 1992. This literature demonstrates that these products are significant, both for supporting sustainable forestry and because they provide critical economic value to lower-income, minority and disenfranchised populations. Indeed, the value of sustainably harvested NTFPs in tropical forests can often outweigh the value of other land uses such as logging, farming or grazing (Peters, Gentry and Mendelsohn, 1990; Balick and Mendelsohn, 1993; Grimes, Loomis and Jahnige et. al. 1994). Even in North American forests, NTFPs have been shown to provide significant additional income and even opportunities for small entrepreneurs (Thomas & Schumann, 1993; Shelly & Lubin, 1995; Emery, in prep.). Indeed, NTFP markets have grown an estimated 20% in the last few years, and the U.S. herbal market has grown at an annual rate of 13%-15% (Hammett, personal communication).

Research has yet to Explore or Value Urban NTFPs

Despite the documented values and growing markets of NTFPs internationally and domestically, no one has yet explored the current uses or potential values of NTFPs from urban forests where most Americans, particularly disadvantaged Americans, live. Even internationally, the United Nations "Annotated Bibliography of Urban Forestry in Developing Countries," which contains over 570 annotation, contains none specifically discussing or valuing Urban NTFPs.

Urban NTFPs may seem like a strange idea, and one's first reaction may be that no one has explored these products because no one uses them and they have little value, but this is not the case. Our initial research in Baltimore, Maryland over the past three year indicates that

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individuals and groups currently collect and use at least 8 different Urban NTFPs for personal consumption, cultural use and market sale. These initial investigations have just touched the surface of what we believe to be a much broader array of products that have actual and potential use and value. The products known to be currently collected include:

Figure 1: Known Urban NTFPs in Baltimore, MD

Product	Species	Use
• Chinese chestnuts	*Castanea mollissima*	Food, personal use and barter
• walnuts	*Juglans nigra*	Food, personal use
• maple sap	*Acer saccarinum*	Maple Syrup, personal use and gifts
• woodland mushrooms	various (Miatake Oyster, Morels, etc.)	Food, personal use and market sale
• gingko fruits	*Gingko biloba*	Medicinal, personal use and barter
• figs	*Ficus carica*	Food, personal use
• honey (from flowers of:)	*Tilia cordata* *Robinia pseudoacacia*	Food, personal use and gifts
• decorative greens / cones	*Ilex sp.* *Pinus sp.*	Holiday decorations, personal use and sale

It is clear that NTFPs in American cities do have value, actual and potential. They represent important economic and cultural resources to many different individuals and groups including a variety of ethnic, minority and lower-income residents. They deserve to be studied further.

Building on Past Research:

This project will draw on past NTFP research in many ways, but it also stands apart. As noted, over the past few years the importance of NTFPs from rural forests has been increasingly documented. This project builds on that foundation. We will use successful ethnobotanical research methods used in past NTFPs studies in Southeast Asian, Latin America and North America. We will draw on the existing North American research in rural areas to help identify potential NTFPs and their uses (Thomas & Schumann, 1993; Emery, in prep.). We will use NTFP market analysis and valuation techniques employed in past research (Godoy, Lubowski, and Markandya, 1993). And we will explore NTFP issues from land tenure to marketing to cultural significance that have been identified as being critical by past researchers. In these ways, this project draws on the successful efforts from past research rather than re-inventing any wheels.

However, this project stands apart from all past NTFP research by identifying and valuing Urban NTFPs. Given that nearly 80% of the U.S. population lives in urbanized areas, including many minority and disadvantaged residents, this project will fill a significant research and educational void. In addition, this project will build on the valuation methods used in past research. Whereas most previous studies used one technique to value NTFPs either on per product, per tree or per land area basis, this study will assess urban NTFPs values using each of these methods to generate a greater and more realistic understanding of current and potential values.

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Proposed Project Objectives:

- Identify and document current and potential urban NTFPs.
- Quantify the current and potential values of various urban NTFPs in Baltimore, MD
- Conduct an initial investigation of potential micro-enterprise opportunities involving NTFPs
- Document and communicate these NTFP uses and values nationally
- Begin to explore urban NTFP issues such as land tenure, collection permits, contributions to household sustenance, marketing and cultural meanings to different ethnic groups.

Scope:

This applied research project explores the economic and cultural uses and markets of forest products and therefore directly examines a critical human - forest relationship. We will identify current and potential NTFPs used in five North American cities. (Note: this represents an addition to our pre-proposal scope and methods, and the additional time required is reflected in our budget.)

We will further explore and specifically value urban NTFPs in Baltimore, Maryland in detail. We will then document and communicate this information nationally, as widely as possible using a variety of dissemination mechanisms.

This documentation of Urban NTFPs and their potential values will be of national importance, and we anticipate that the results of this project will be disseminated, debated and used on a national level as Urban NTFPs are further explored and as micro-enterprise opportunities are developed.

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Relevance and Impact:

This project is relevant to urban and community forestry nationally and internationally, and as the table below indicates, it is relevant specifically to the priorities and goals identified by the Council in many ways.

Council Priorities:	**How this project meets these priorities:**
Category 1 Goal: Understand the relationship between urban / community forest resources and humans	• This project will broaden our understanding of an important human - urban forest relationship in an area that has not even been explored, urban residents use of non-timber products.
Priority A: Information, communication and technical information exchange are key . . .	• Through this project, we will communicate and exchange the technical information that results from this work to urban and community forestry professionals and activists around the country.
Priority B: Important to assess the values, perceptions and needs with respect to our growing multi-cultural populations . . .	• This project will also explore the importance of this human - forest relationship and these values as they specifically relate to urban minority, women and disadvantaged populations. These are groups are have traditionally benefited less from the known benefits of the urban forest, but groups that may be more likely to benefit from Urban NTFPs.
Priority D: Educating people about the importance of urban and community forestry . . .	• It will contribute to the educational materials used in the U.S. to explain and market the value of urban and community forests.
Priority C & D: Taking a holistic view of Urban and Community Forestry . . . Marketing the value of the urban forest . . .	• It will explore and quantify the uses and values of urban NTFPs, thus documenting an additional economic benefit of the urban forest that has not yet been included in our understanding of urban forest value. We hope that these values will then be incorporated into our tools and techniques for assessing the benefits of urban forests nationally.
Priority E: Healthy urban forests can assist in improving local economies . . .	• Finally, the recognition and documentation of these values and issues surrounding NTFPs may lead to future development of entrepreneurial activities around the collection and sale of urban NTFPs as small-businesses, economic generators and an educational opportunities.

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Methodology:
Our methodological design has drawn from and builds upon the experiences and practices of NTFP research projects internationally and domestically. It is designed to help us collect this critical baseline Urban NTFP information quickly and efficiently to make the most of the resources available.

We propose to:

- Conduct a literature review related to North American NTFPs and urban forest products. We will review periodical literature from urban forestry and international forestry journals. We will conduct Internet searches on the World Wide Web for sites related to NTFPs. And we will contact and interview professionals and academics in the field with experience in urban forestry and NTFP research.

- Interview and / or survey up to 20 urban and community forestry professionals from five North American cities regarding their knowledge of currently and potentially used Urban NTFPs in their cities. These interviews will include specifics with respect to species, products, uses and users. We expect these cities to be Baltimore, Philadelphia, New York, Chicago and Seattle.

- Work with the Baltimore City Arborist and Tree Inspectors, the Maryland State DNR Foresters and the Parks & People Foundation Community Foresters to identify any additional potential urban NTFPs. These individuals have decades of experience interacting with Baltimore's urban forests and its variety of users, and hold a wealth of knowledge.

- Interview approximately 100 individuals: community forestry activists, community leaders, parks friends leaders, park users, representatives from various ethnic groups, and long time city residents to begin to identify the widest range of potential urban NTFPs in Baltimore, Maryland. Our interviews will encourage participants to reflect broadly about all the products that may or may not be collected and used. We will make additional efforts to reach women and minority representatives. We will use four different methods to identify potential interviewees.
    - Existing Networks: we will tap into the networks of those who have already been identified as interested in urban and community forestry in Baltimore. These individuals include, City Forestry contacts, Parks & People Community Forestry contacts, Baltimore Tree Tribe, Baltimore City Community Forestry Board, members of related groups, etc.
    - Observation: urban and community forestry professionals in Baltimore have been observing NTFP collection for years. We will target sites of collection and identify users at these sites.
    - Market Interviews: we will visit local farmers, open air, fresh foods, natural product and ethnic food markets to identify potential NTFPs, collectors and sellers.
    - Snowball Approach: we will ask each person that we identify and interview to help us identify additional individuals.

- Interview specific collectors and users of urban NTFPs, gathering information on quantities collected, quantities available, seasons for collection, time and materials required, potential markets, market prices and substitute products (those market products that these NTFPs may replace) where appropriate.

• Visit local market sites (Baltimore has seven open city markets and numerous farmers markets) to assess the products sold, suppliers, selling prices, market demand, substitute products and substitute product prices.

• In two Baltimore Neighborhoods and one selected park area of equal size, we will then conduct an inventory of trees and assess the trees that produce potentially valuable products. These three specific areas will be selected in conjunction with the Parks & People Foundation's Community Forestry Program and the Baltimore Long-Term Ecological Research Project so that the information we collect will be of maximum use to related urban and community forestry initiatives in Baltimore. Our criteria for selecting these areas (see attached maps) will be:

- Connections to existing urban and community forestry initiatives
- Community interest in urban and community forestry activities
- That they represent a continuum along an urban gradient from inner-city to lower density
- That they represent a continuum of economic need as defined by 1990 census indicators

• We will then quantify the values of urban NTFPs on a per product per unit basis (i.e., per gallon of maple syrup), a per average adult tree basis (using trees that are actually collected from) and a per neighborhood basis. Using these three valuation methods allows us to gain a better understanding of the potential values of NTFPs and the implications of encouraging NTFP cultivation and collection.

• Disseminate our results nationally to urban and community forestry professionals and activists through national publications, press releases, Internet and presentations (see detailed strategy below).

Product / Dissemination Plan:

We will use a variety of different distribution and dissemination methods to insure that our results are available as widely as possible. We will:

• Document results of our work in a Working Paper. Ten copies of this paper will be sent to NUCFAC with our final report and it will be available for at least five years upon request at production, handling and shipping costs.

• Seek publication of our research results in a nationally circulated professional journal (such as the Journal of Arboriculture).

• Send summaries of our results to the Federal and State Urban Forestry Coordinators and urban and community forestry councils nationwide regardless of the outcome.

• Develop and submit press releases of our results (if appropriate) and circulate them to both local and national media organizations.

• Develop a Web Page detailing our study, methodology and results.

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• Post summaries of our results and links to our Web site from appropriate Web sites and Internet discussion lists including Tree-Link, TreeTown, USDA Forest Service and City-Farmer.

• Present our results at appropriate conferences and meetings around the country as invited.

Project Evaluation:

We will evaluate the success of this project based on our stated objectives:

- Identify and document current and potential urban NTFPs nationally.
- Quantify the current and potential values of various urban NTFPs in Baltimore, MD
- Document and communicate these NTFP uses and values nationally
- Begin to explore urban NTFP issues such as land tenure, collection permits, contributions to household sustenance, and cultural meanings to different ethnic groups.

Specifically, we will evaluate our success based on:

A) Our ability to successfully identify and quantify urban NTFPs (number of products identifies, number of collectors interviewed, product values, etc.)

B) The level and degree circulation of our results (where they are published, number disseminated, where disseminated, who has requested copies, etc.)

C) The feedback we receive based on our results

To do this, we will monitor the number and value of the NTFPs that we identify, the number of requests we receive regarding our project, hits on our web page, and feedback we receive on our process and results. We will include a specific evaluation / feedback survey form in the dissemination of our results. We will also use our advisors and partners to provide ongoing evaluation of the project and its results.

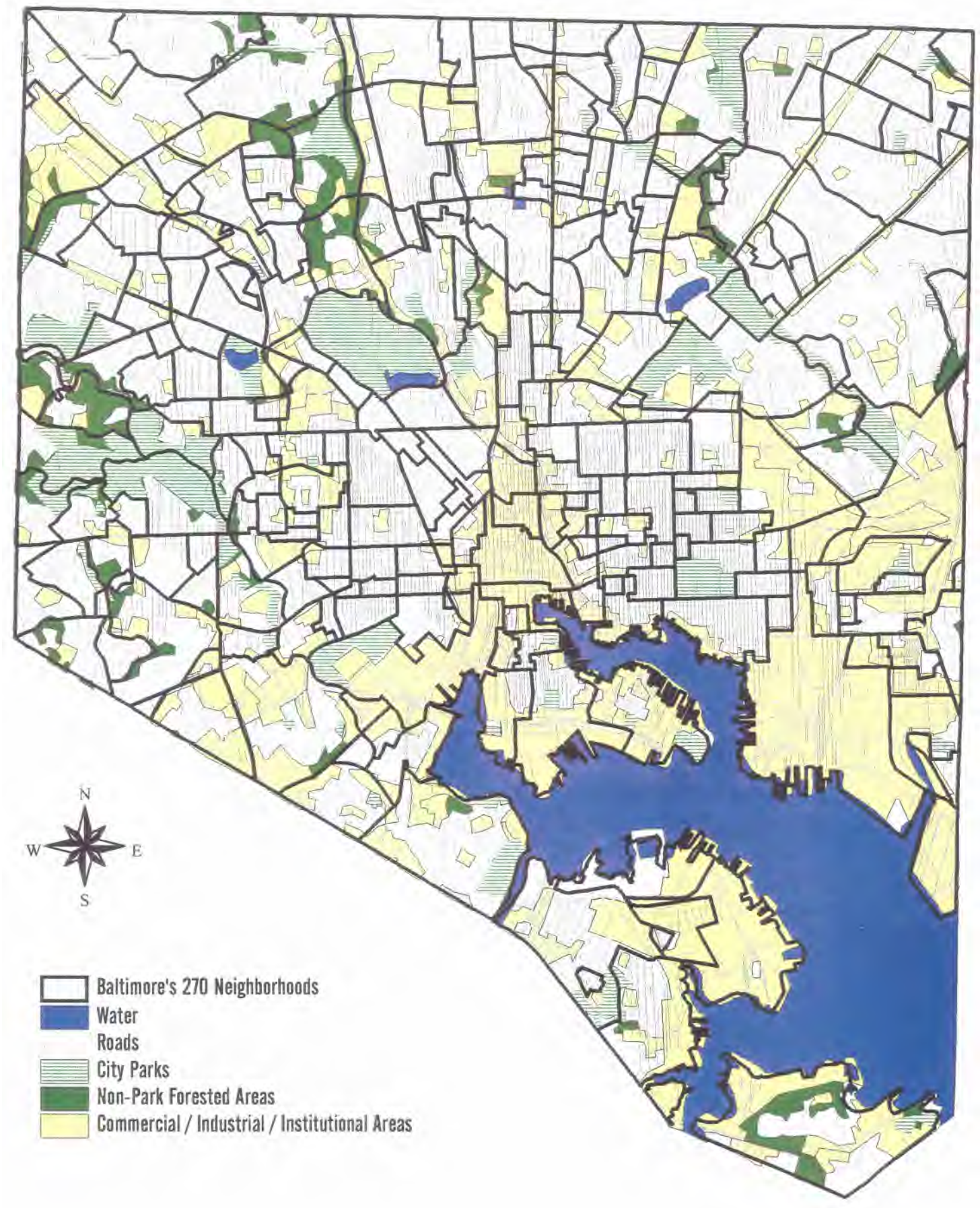
Personnel and Partnerships:

About Community Resources

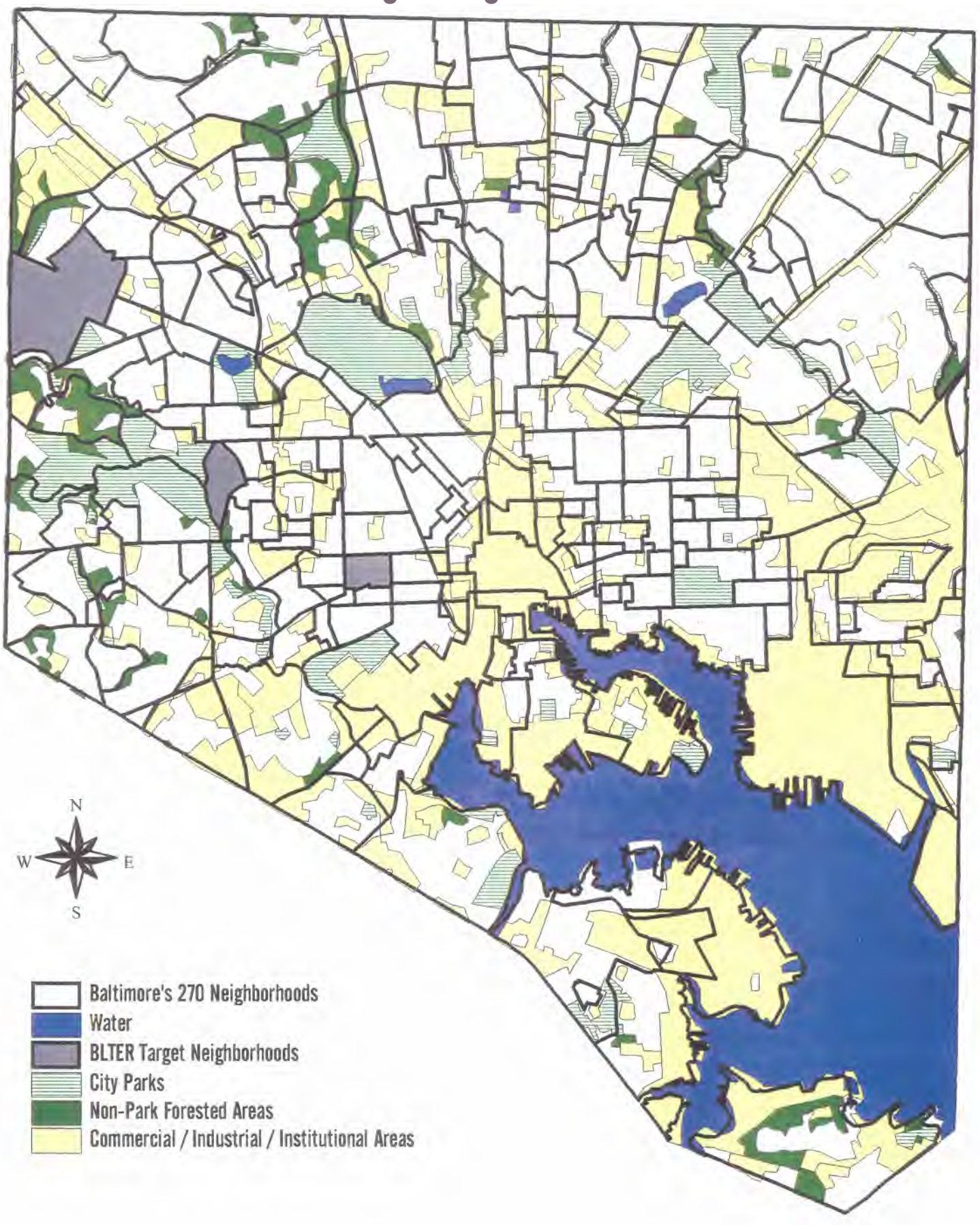
Community Resources, a regional urban environmental nonprofit, brings the experience to manage and complete this project at a relatively low cost. Our mission is to work in partnership with community groups and public agencies in cities around the country to help them develop and implement urban environmental programs that meet growing community needs.

Our Executive Director, Paul Jahnige, has a Masters from the Yale School of Forestry where he completed important NTFP research in Latin America (Grimes, Loomis and Jahnige, et. al. 1994). The methodology for this proposed project draws in part from the successful ethnobotanical methods used in that effort. Community Resources' Program Director, Anne Todd Bockarie, brings a Ph.D. in forestry extension from the University of Florida where she completed a model project on monitoring sustainability. Our Board brings together a wide array of exceptional individuals (see attachment for more information.)

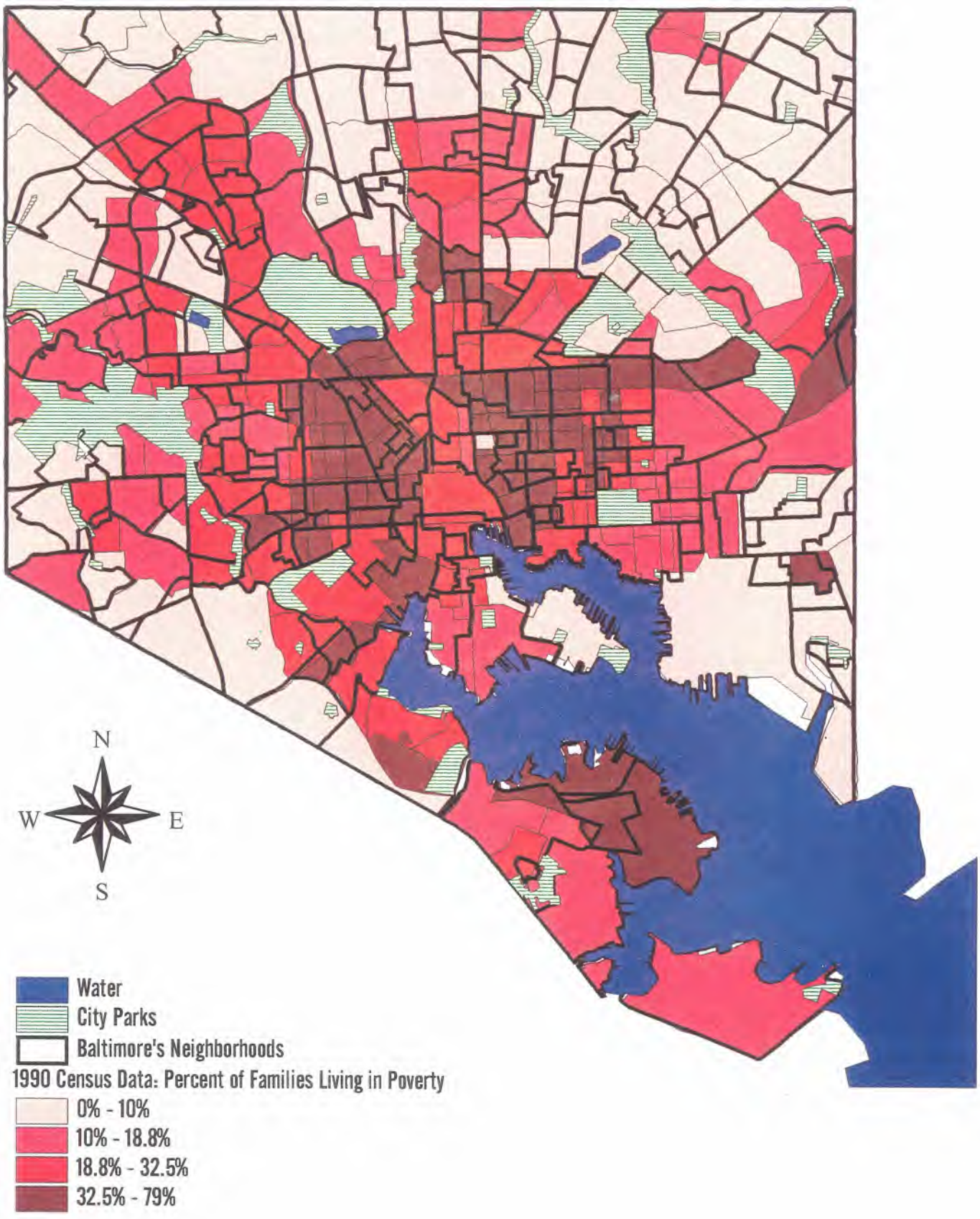
Baltimore City and Its 210 Neighborhoods



Baltimore Long Term Ecological Research Project
Target Neighborhoods



Baltimore City with
1990 Census Data: Percent Families Living in Poverty



Community Resources is currently directing urban environmental programs in Washington D.C., Baltimore and Philadelphia including:

- An Urban Community Assessment project funded, in part, by the EPA
- A five-year $650,000 Natural Lands Restoration and Environmental Education Monitoring and Evaluation project with the Fairmount Park Commission in Philadelphia
- A Natural Resource Training Program with the Earth Conservation Corps in Washington D.C.
- Participatory Monitoring and Evaluation project with the Philadelphia Department of Recreation

Partners

Our partners and advisors on this project bring the necessary technical and academic skills to the research. They include:

Baltimore City Section of Forestry: James Dicker / Marion Beddingfield

Baltimore City Forestry will work with us to identify potential NTFPs, NTFP collectors and collection sites. The Section of Forestry's professionals have decades of experience working with and observing the urban forest and communicating with individuals and groups in Baltimore. They bring a wealth of knowledge to this project and are committed to it.

Dr. Robert Mendelsohn, Natural Resource Economist, Yale School of Forestry

Dr. Mendelsohn will serve as an advisor on this project, reviewing our methodology, valuation methods and final report. He has conducted and advised on NTFP valuation projects around the world. He brings both a practical and rigorous perspective to this effort.

Dr. Ed Cesa, Forest Products Specialist, USDA Forest Service, West Virginia

Dr. Cesa will be an advisor on the project, providing his expertise in forest products research.

Dr. Marla Emery, USDA Forest Service, Burlington, VT.

Dr. Emory has agreed to collaborate on this research. She will assist will field research, data collection and analysis. Dr. Emery has recently finished innovative NTFP research in the Michigan. She also heads up the Northeast Decision Making Model project for the USDA Forest Service.

The Community Forestry Program of the Parks & People Foundation in Baltimore

Parks & People is our primary partner in this work. The Community Forestry program has facilitated hundreds of community plantings in Baltimore over the past few years with thousands of residents especially lower-income and minority residents. In addition, they have developed the "Tree Tribe" and "Garden to Market" training programs for Baltimore community forestry activists.

Numerous local community organizations noted in our methodology.

Staff

Our Executive Director will oversee this project. In addition, Community Resources will hire a lead researcher and research associates to complete this project who have experience in urban and community forestry issues and research methods. We will also partner with the community forestry staff of the Parks & People Foundation who have years of grass roots organizing experience with Baltimore's inner-city residents. Finally, we will identify and hire additional research associates representing or with contacts in various ethnic communities in Baltimore as appropriate.

Timeline:	Sum.	Fall	Win.	Sprng	Sum.	Fall
Activity	1998	1998	1999	1999	1999	1999
Hire Research Staff	X					
Contact Professionals in Five Cities	X	X				
Interview Key Informants in Balt	X	X	X	X		
Interview Collectors in Balt		X	X	X	X	
Market Observation in Balt	X	X		X	X	
Write Preliminary Results			X			
Target Neighborhood Tree Inventories					X	
Valuations by Product, Tree & Neighborhood					X	
Write Working Paper					X	
Publish Results						X
Distribute Results						X

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BUDGET

Applicant: Community Resources
Project: Valuing Urban Non-Timber Forest Products
Total Cost: $83,950
NUCFAC Request: $41,975

Item	Federal Funds Requested	Non-Federal Match cash	Non-Federal Match in-kind	Total	Source of Match Funds
Research Personnel	$32,000	$8,800	$18,500	$59,300	Community Resources ($3000 cash to be raised) Parks & People Foundation City Forestry State DNR
Communications	$1,000	$500	$1,100	$2,600	Community Resources Partner organizations
Print / Copy	$800		$1,500	$2,300	Community Resources Partner Organizations
Supplies	$1,000	$800	$1,000	$2,800	Community Resources Partner organizations
Occupancy		$1,000		$1,000	
Travel	$700		$1,000	$1,700	Partner organizations
Distribution Costs (web/copy/post)	$1,000	$900	$1,400	$3,300	Community Resources to be raised
SUB-TOTAL	$36,500	$12,000	$24,500	$73,000	
Indirect Cost (15%)	$5,475	$5,475		$10,950	
TOTAL	$41,975	$17,475	$24,500	$83,950	

PP Budget 38,870 + 39,100 = 77,970

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BUDGET NOTES:

Total Project Cost: The total project cost and the requested amount are both slightly hirer than indicated in our pre-proposal. We are now proposing to increase our scope and change our methods to include initial investigation of Urban NTFP uses in five cities. This will necessitate a an increase in staff time which is reflected in the current project cost.

Personnel: includes a lead researcher for 1,200 hours at $30/hour plus part time research assistants plus part time Parks & People Community Foresters= $59,300. This amount includes payroll and salary burden.

Communications: includes all phone, fax, Internet, courier and postal fees/costs associated with this project including long-distance phone interviews with professionals in other cities and communications with our project advisors and partners. In kind costs include these costs which will be borne by our project partners.

Print/Copy: includes all photo copy and film development costs associated with the literature search, field observations, interviews, etc. for both Community Resources and our partner organizations.

Supplies: Includes research and office supplies associated with this project including but not limited to: tape recorder, camera, film, data management and storage equipment, tree inventory supplies, and general office supplies.

Occupancy: represents the costs of renting and maintaining office space for research personnel associated solely with this project. These costs will be borne by Community Resources.

Travel: includes personal vehicle travel around Baltimore for interviews and observation for both Community Resources and partner staff-- 90 miles per week for 40 weeks at $.29 per mile ($1,044) plus travel costs to one or two national conferences to present results.

Distribution: includes costs associated with those distribution strategies proposal in the text.

Indirect Costs will be equally borne by NUCFAC and Community Resources' funds, and reflect the indirect costs of running and operating a non-profit organization.

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COMMUNITY RESOURCES EXECUTIVE SUMMARY

Urban Issues are Everyone's Issues!

Nearly 80% of Americans live in an urbanized area. Over 50% call one of the forty largest U.S. cities their home. Yet the quality of life in most urban neighborhoods is rapidly deteriorating. Waterways are degraded, the air is polluted, young people are assaulted by drugs and community institutions are dissolving. These issues are critical, not only because inner-city residents are being besieged by poverty and pollution, but because these "urban issues" affect the health of our ecosystems, communities and economies on a regional scale.

These environmental, social and economic problems are all related, and thus, fragmented approaches will not solve them. We must take broader approaches, to both environmentalism and community development, to address the integrated issues affecting our society.

Community Resources: Sharing the Lessons Learned.

Community Resources is a regional nonprofit organization devoted to promoting community-based environmental stewardship as a catalyst for social and economic urban revitalization. Community Resources works in partnership with government agencies, community groups and private organizations, developing urban environmental initiatives that address local issues by making the most of existing resources.

Community Resources' Program Areas

Community Resources develops programs in the following areas:

- Through Community-Based Greening, we help public agencies and community groups create community forestry, youth gardening, vacant lot restoration and environmental health initiatives. Around the country, urban greening has proven to be a successful tool for taking back streets, increasing home ownership and enhancing resident participation in community building.
- Environmental Education and Training Programs for Youth combine neighborhood-based experiential education with natural resource training and a positive work experience. These initiatives can lead to youth empowerment, employment opportunities and viable alternatives for urban youth.
- Participatory Open Space and Resource Planning helps public agencies and communities do more with less and better manage public natural resources for environmental protection, economic efficiency and diverse recreation.
- Through our participatory Monitoring and Evaluation programs, we seek to improve the efficiency, equity and sustainability of urban environmental initiatives, and to help capture the lessons learned so that success can be replicated, and failure avoided.

Finally, Community Resources seeks to tie multiple initiatives together through an approach called Urban Ecosystem Management. In many cases, it is only by managing our human and natural resources as an interconnected ecosystem that we will provide the greatest social, economic and ecological benefits to any target community.

Community Resources' Accomplishments and Significant Projects.

Over the past few years, Community Resources has achieved significant accomplishments working with public agencies and communities in Mid-Atlantic cities. Since 1994, we have worked with the Philadelphia Department of Recreation to develop model urban environmental education programs. Based on this effort, the Department initiated an **Urban Environmental Program for middle school students** in nine inner-city recreation centers as a part of their mission to "build youth, build community." This program currently serves more than 200 students a year at a fraction of the cost of typical "pilot" programs.

Community Resources serves on the Steering Committee of the ***Revitalizing Baltimore*** project. This large-scale urban ecosystem management project combines community organizing, neighborhood greening, environmental education and youth environmental training to cumulatively improve the environmental and social conditions of Baltimore's disadvantaged communities.

In order to help enhance urban natural resource planning and management, Community Resources developed an innovative **Human Ecology Inventory** method to help insure that the needs of the communities are incorporated into park design, management and maintenance. Building on this project, we have now embarked on a project for the EPA Office of Environmental Justice to develop a model method for **Participatory Urban Community Assessments.**

In 1997, Community Resources and Yale University were selected to work with the Fairmount Park Commission in Philadelphia to monitor, evaluate and enhance their multimillion dollar, five-year project of **Urban Woodland Restoration and Environmental Education.**

A History of Success.

Community Resources draws many of its methods and models from its partnerships with the Urban Resources Initiative, the Yale School of Forestry & Environmental Studies, the Baltimore Department of Recreation & Parks, and the Parks & People Foundation. Together, these organizations have brought about significant and innovative changes both on the ground and within institutions in Baltimore, Maryland.

A Call for New Partners.

In order to make the most of the lessons learned in cities like Baltimore, Community Resources is eager to develop urban initiatives with local partners in cities around the country, particularly in the Mid-Atlantic states. As a nonprofit, we are able to offer affordable services and expertise to government agencies, nonprofits and community organizations, and can help fundraise for various initiatives. Included in this packet are sample descriptions of our programs and services, however, all Community Resources' initiatives are developed individually with each partner. Community Resources' services can range from technical support to program implementation. Please contact our Executive Director for more information about Community Resources.

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COMMUNITY RESOURCES BOARD OF DIRECTORS

Dr. Morgan Grove, Chair: Dr. Grove is the founder and first director of the Urban Resources Initiative program (URI). He has worked as a forest ecologist, landscape designer, social researcher, project manager and teacher.

Shawn Dalton: Ms. Dalton is the former director of the Baltimore-URI program where she developed a model participatory natural resource training program. Ms. Dalton also brings expertise in resource planning, program development, training and organizational analysis.

Lucille Gorham: Ms. Gorham is the President of the Middle East Community Organization and Citizens for Fair Housing. She has been a community leader and activist in East Baltimore for more than twenty years where she struggles tirelessly to improve the total environment.

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Paul Jahnige, President

Sally Loomis, Treasurer

Community Resources strives to have a board and staff that are representative of the urban populations with whom we work. Our current Board is 72% women, 28% male and 28% African American.

Report

Alicia Grimes, Sally Loomis, Paul Jahnige, Margo Burnham, Karen Onthank, Rocio Alarcón, Walter Palacios Cuenca, Carlos Cerón Martinez, David Neill, Michael Balick, Brad Bennett and Robert Mendelsohn

Valuing the Rain Forest: The Economic Value of Nontimber Forest Products in Ecuador

This study calculates the value of three ha of primary forest in the Upper Napo region of Amazonian Ecuador based on the potential extraction of nontimber forest products (NTFPs). Through ethnobotanical and market surveys, the annual harvest levels, market prices and extraction costs of seven fruits, three medicinal barks, and one resin are measured. The present value of net revenue from NTFP collection is USD 2830 in the upland plots and USD1257 in the alluvial plot which is significantly higher than the returns from alternative land uses in this area.

INTRODUCTION

Economic analyses of tropical forests have traditionally focussed on timber harvesting or land conversion for agricultural or livestock production, overlooking the value of nontimber forest products (NTFPs). Critics of these analyses argue that agriculture and livestock production in tropical forest areas have negative ecological impacts, tend not to be sustainable as practiced, and sometimes exhibit low economic value (1-5). In recent years, attention has shifted to the economic value of nontimber products from tropical forests. Studies are beginning to demonstrate that the sustainable extraction of these resources may provide significant benefits to local people while simultaneously conserving the biological resources of standing forests (6-8).

The extraction of NTFPs for sale in local markets in Iquitos, Peru, was more profitable than timber harvesting or cattle ranching in the same area (7). An investigation of medicinal plants in Belize reached similar conclusions (8). However, the results of these two studies cannot be extended to all tropical settings. The value of any single site will depend upon the species at the site, the proximity of markets, and whether the land is in private, public, or communal ownership. Numerous studies of this nature will be necessary before making economically efficient land-use decisions in other tropical forest areas.

In this study, we use ethnobotanical interviews and market observations to systematically value three separate hectares of mature forest in Amazonian Ecuador used for the extraction of non-timber products. We base the analysis on the current value of fruits, medicinal barks and resins from trees 10 cm in diameter at breast height (dbh). We then compare the potential income from the sale of these products to the net revenues obtainable from cattle ranching and timber harvesting in this area.

In this valuation, we augment the methodology developed in Peters et al. (7) by separately valuing trees on an individual basis, rather than at a per species level. This allows us to better account for the wide variations in production levels and harvest also report the uncertainty of our estimates so that future studies can focus on the parameters which are most poorly understood in these assessments.

SITE DESCRIPTION

We carried out this study using three one-hectare permanent forest plots at the Jatun Sacha Biological Station (1 ◦04' S; 77° 36"W) on the south bank of the Napo River, 8 km from the town of Puerto Misahualli, Ecuador. The research site is located in mature phase "tropical wet forest" and has a mean annual rainfall of 4100 mm (9) fairly evenly distributed throughout the year. The Jatun Sacha Biological Station currently owns approximately 500 ha of primary and secondary forest in this area, and has been managed as a private foundation since the mid-1980s.

Two of the study plots at Jatun Sacha are located in *tierra firme* forest with red clay Dystropept soils at an elevation of about 400 m. The third plot is along the bank of the Napo River in floodplain forest with alluvial soil at 350 m in elevation. These plots were chosen and demarcated independent of their species diversity or economic value, and they represent a range of soil types and floristic composition (10).

The indigenous people who inhabit this region are the Quijos Quichua. As resource managers, they engage in hunting, forest product collection, and the cultivation of yucca, plantains and home-garden crops. Many of the Quijos Quichua have only recently become involved in market transactions. The construction of a road in 1987 between the towns of Puerto Napo and Ahuano has increased market accessibility and contact with colonial entrepreneurs who have come to the area to raise cattle and cultivate cash crops.

METHODS

Between 1987 and 1991, Palacios, Ceron and Neill conducted a biological inventory of all of the trees and lianas 10 cm dbh on the three permanent plots at Jatun Sacha Biological Station. This inventory indicates that these forests are highly species rich with a range of 185 to 245 species of trees 10 cm dbh per ha. These botanical inventories provided scientific identification of each tree. Over the last three years, Alarcon and Bennett conducted ethnobotanical research on these plots recording the extensive use of the forest by the Quijos Quichua.

Grimes, Burnham and Onthank in the summer of 1991 and Grimes, Loomis and Jahnige in the summer of 1992, interviewed eight Quijos Quichua forest collectors in small groups at the site. They examined each tree species (10 cm dbh) to obtain the common name, uses, and marketable products. Through this process, 13 species were identified on the study plots that produce goods of market value. Visits to local markets verified

The Quijos Quichua guides examined every tree for each of the 13 species which produce market products in the three plots. The guides estimated the annual sustainable harvest amounts for each specific tree. Fruit yields and bark and resin yields were estimated separately.

In order to estimate the annual yield of potentially valuable fruit-producing trees, each tree was surveyed with at least two groups of guides. This provided multiple estimations of the production from each tree. The guides estimated average annual fruit yield in both number of units and by weight, the number of trips needed to collect a full harvest, and both the collection and transportation time per trip. To further ensure that the reported sustainable collection rates are ecologically sound, the reported harvest levels were reduced by 25% to take into account losses for wildlife, spoilage, and regeneration.

For bark-producing species, the Quijos Quichua guides and several traditional healers reported that annually removing a vertical strip 1-4 m in length up to one eighth of the perimeter of the tree would not result in mortality or critical damage. The specific height to which one could remove the bark depends on individual tree size, vigor, and convenience. The guides estimated the harvestable height for each tree and we calculated the harvestable width from the dbh measurements taken during the botanical inventory. Bark harvesting in other parts of the world has been carried out at similar degrees of intensity (11), although ecological research on the sustainability of bark harvesting is needed.

A variety of collectors reported that appropriate harvest levels from resin-producing trees range from one to five pounds annually depending on the diameter, height and health of the tree. However, long-term botanical studies should be done to confirm the sustainable levels of extraction and determine what factors may influence production.

There are advantages and disadvantages with the ethnobotanical approach used in this study. The Quijos Quichua guides are experienced harvesters of NTFPs from the forests near Jatun Sacha. They are familiar with the long-term fluctuations in production inherent in local species and attempt to account for this variance in their estimates. By examining each tree, growth form, age, height, surrounding light, and microsite can all be taken into account. Local collectors are also able to determine whether non-destructive harvesting from a given tree is feasible. For example, in order to harvest forest fruits without felling the tree, local collectors climb (without equipment) the fruit-producing tree or an adjacent pole tree. The potential for nondestructive harvesting, thus, often depends on the willingness and ability of collectors to climb a given tree, an important factor that generally cannot be ascertained by ecological studies.

The ethnobotanical approach also has drawbacks. For example, researchers must rely on estimates of amounts and weights that may never have been measured by scientific standards. Interviewers may misunderstand responses and guides may misinterpret the questions. Further, estimates by collectors may be influenced by incorrect assumptions regarding ecological processes, level of experience, and their relationship with the researchers. In addition, the Quijos Quichua are not accustomed to regularly harvesting maximum sustained levels for market sale. For these reasons, long-term ecological studies, though costly, may be necessary to verify the results of ethnobotanical studies. The information gained from such studies would indicate the reliability of ethnobotanical data in valuations such as this and clarify whether assumptions made in the course of these rapid studies are justified. By jointly conducting long-term ecological studies in conjunction with ethnobotanical surveys, researchers can check the accuracy of their data and 'calibrate' the estimates of local guides.

ASSESSING MARKET VALUE AND TOTAL COSTS

Having gathered data on yields and harvesting time through interviews on the plots, data on market prices, transportation costs, and retail costs for all products were collected. The weekly market in Tena was visited regularly and periodic visits were made to markets in the surrounding towns of Misahualli,

Table 1. Marketed NTFPs from the Upper Napo Province, Ecuador.

Family	Scientific name	Common name	Number of trees in 3 plots	Product use
Arecaceae	*Jessenia bataua* (Mart.) Burret	Ungurahua	15	Food/Med
Moraceae	*Batocarpus orinocensis* Karst.	Sacha Paparahua	9	Food
Sapotaceae	*Chrysophyllum venezuelanense* (Pierre) Pennington	Sacha Caimito	7	Food
Lecythidaceae	*Grias neuberthii* J. F. Macbr.	Piton	10	Food
Fabaceae-Mimosoideae	*Inga* aff. *spectabilis* (Vahl) Willd	Mangalpa Cachig	7	Food
Sterculiaceae	*Theobroma subincanum* Mart.	Cushilio Cambiag	7	Food
Clusiaceae	*Garcinia* sp.	Pungara Muyu	4	Food
Fabaceae-Fabaceae	*Myroxylon balsamum* (L.) Harms	Balsamo	1	Medicinal
Olacaceae	*Minquartia guianensis* Aublet	Huambula	8	Medicinal
Ochnaceae	*Cespedezia spathulata* (Ruiz & Pavón) Planch.	Amaron Caspi	1	Medicinal
Burseraceae	*Protium fibriatum* Swart	Shillquillo	23	Handicraft
Burseraceae	*Protium nodulosum* Swart	Shillquillo	8	Handicraft
Burseraceae	*Protium sagotianum* E. Marchand	Shillquillo	1	Handicraft

Archidona and Puyo during June, July ?.d August of 1991 and 1992. From a combination of market observations and interviews with buyers and sellers, the prices of forest products were determined. Products were regularly weighed to confirm prices per unit weight (12). The indigenous guides frequently accompanied us in the markets to verify the tree names from which products originated.

All but one of the fruits included in this valuation were in season during the period of this study, allowing us to directly observe market transactions. The medicinal barks and resins are all sold and harvested throughout the year. To collect data for the one fruit not in season *(Chrysophyllum venezuelanense)*, we interviewed several forest collectors and market vendors to confirm that the fruits are actually sold, and to verify the selling price and rate of sale. These reports were quite consistent.

To supplement our field and market data, we interviewed several tradespeople who regularly used the NTFPs found in the plots at Jatun Sacha. Three local pottery makers clarified the source, availability, and demand for a resin used as a ceramic varnish. Two traditional healers provided information regarding the sale and identification of various herbal medicines. We visited the homes of our guides to directly observe the use of forest products. In addition, our guides questioned their friends and family members to confirm market sale, harvest levels, and product uses.

During the extraction and sale of forest products, a collector incurs significant costs associated with the collection, transportation, processing, and sale of these products. A major component of these costs is the time spent conducting the above activities. Guides estimated collection times per tree as a function of harvest amounts. Transportation costs included both the time needed to carry products from the plots to the road, as well as the bus or truck fare to the nearest market. The site at Jatun Sacha is 30 km from the market and the transportation mode is a local bus. The time required for extraction, transportation, and sales was multiplied by the local wage of 500 sucres per hour. Market sellers also reported processing (i.e. cooking and preparing) and packaging costs per product. We collected and calculated all prices and costs in sucres and translated them into dollars using the exchange rate of USD 1 = 1450 s.

Forest collectors generally sell barks and resins to shop owners or intermediaries for wholesale values but market fruits themselves. For barks and resins, the gross revenue was calculated based on a wholesale price which we assumed to be 75% of the observed retail price (based on observations of wholesale and retail price differentials). This proportion between wholesale and retail prices was confirmed for one product, but this assumption should be verified in future studies.

RESULTS

Table 1 lists the eleven locally sold NTFPs found in the permanent plots at Jatun Sacha. Forest collectors harvest these products from thirteen tree species. The valued products include seven fruits, three medicinal barks and one resin. However, only 72 of the 105 individual trees of the species in Table 1 are actually valued because only 72 of the trees are deemed sustainably harvestable by Quijos Quichua forest collectors. The remaining trees were either too young to produce, too tall and dangerous to climb, or nonproductive. While this method may underestimate some of the forest's potential value, we believe that it offers a more realistic assessment of what local people could actually extract sustainably.

To determine the value of the Jatun Sacha plots for NTFP extraction, we calculate the net revenues obtainable from the sale of all the products from the 72 economically-viable trees

Table 2. Plot A valuation summary.

Species name	Number of trees	Number of trees valued	Total sustainable harvest	Price per unit USD	Gross revenue USD	Total costs USD	Net annual value USD
Jessenia bataua	10	2	163 lbs (35)[1]	14	22.55 (4.90)	5.34 (0.78)	17.21 4.96)
Batocarpus orinocensis	4	1	563 fruits (91)	0.023	12.95 (2.09)	4.46 (1.45)	8.49 (2.54)
Chrysophyllum venezuelanense	3	1	253 fruits (44)	052	13.11 (2.29)	2.72 (0.52)	10.39 (2.35)
Grias neuberthii	6	3	32 fruits (5)	0.07	2.22 (0.35)	1.16 (0.10)	1.06 (0.36)
Theobroma subincanum	2	1	46 fruits (14)	0.07	3.21 (0.98)	1.07 (0.38)	2.13 (1.05)
Myroxylon balsamum	1	1	17 doses[2] (6)	0.16	2.64 (96)	0.35 (0.13)	2.28 (0.97)
Protium sp.	18	18	27 lbs (15)	4.14	111.72 (62.10)	16.37 (6.14)	95.36 (62.40)
Minquartia guianensis	4	4	44 doses[3] (17)	0.26	11.38 (4.42)	1.37 (0.52)	10.01 (4.45)
Total plot A net annual value							146.93 (62.67)

1 The number in parentheses is the standard error.
2 The average dose of *Myroxylon balsamum* is 140 cm^2 of bark.
3 The average dose of *Minquartia equals* 120 cm^2 of bark.

on the plots. We compute the potential revenues from the products on a per tree basis and then sum across all trees to calculate the total revenues of each plot (Tables 2, 3 ,tad 4). Net Annual Value (NAV) is simply:

NAV tree = Gross Revenue tree — Total Costs tree

where Gross Revenue is price per unit times annual harvest and total cost is the sum of harvest, transportation, and sales costs.

Tables 2, 3, and 4 present the results for each of the three plots. The most important product in the three plots was from the genus *Protium.* Surprisingly, the economically valuable *Protium* product is neither a food nor medicine but rather a ceramic varnish used for local handicrafts. The three tables indicate several other species also contribute significantly to the value of the three plots. *Jessenia bataua, Batocarpus orinocensis, Chrysophyllum venezuelanense* and *Minquartia guianensis* provide about one third of the income of the two upland plots. *Garcinia macrophylla* and *Inga aff spectabilis* provide over half of the value of the alluvial plot. By having a multiplicity of products to collect on each trip, harvest costs are kept low.

Also displayed in Tables 2, 3, and 4 are estimates of the uncertainty surrounding the productivity and cost numbers. The standard errors reported reflect discrepancies amoagst collectors and inherent variation in different trees. This problem was especially troubling with the *Protium* spp. as different collectors disagreed which specific trees could yield the desired product. There is consequently considerable remaining uncertainty about the productivity of *Protium* trees on the plots. Assuming that these errors are independent across species, the variance of aggregate plot production is equal to the sum of the variances of each species. The 95% confidence interval of net annual income for plot A lies between USD 22 and USD 272, for plot B between USD 38 and USD 234, and for plot C between USD 29 and USD 97.

Because alternative land uses provide returns over different time frames, it is necessary to compute a single common index across time to compare each alternative. By discounting all future returns to the present, one can compare very different streams of revenue with one another. The Net Present Value (NPV) of each land use is the value of all future income in today's dollars. We assume annual harvests of NTFPs are sustainable. Although the numbers and production levels of trees will certainly change with time, these changes should offset each other.

For a land use which provides constant annual returns, the NPV is:

NPV = NAV / r

where r is the inflation-free discount rate. In this analysis, we assume that the discount rate is 5% (18).

As shown in Table 5, the Net Present Values for NTFPs from the two upland plots are estimated at USD 2939 for plot A and USD 2721 for plot B. The alluvial plot C has an NPV of USD 1257. The average NPV of the two upland plots is USD 2830, and the average per ha value of NTFPs from all three sites of mature phase forest at Jatun Sacha is USD2306.

ALTERNATIVE LAND USES

To determine the value of timber resources in this area, two local wood contractors conducted a timber cruise on the upland plot A. They surveyed the entire plot, identified all potentially

Table 3. Plot B valuation summary.

Species name	Number of trees	Number of trees valued	Total sustainable harvest	Price per unit USD	Gross revenue USD	Total costs USD	Net annual value USD
Jessenia bataua	5	3	216 lbs (98)	0.14	29.79 (13.72)	7.55 (3.18)	22.24 (14.08)
Batocarpus orinocensis	3	1	1476 fruits (360)	0.23	33.95 (8.25)	10.73 (2.37)	23.22 (8.68)
Chrysophyllum venezuelanense	1	1	7.5 fruits (4)	0.052	0.39 (0.21)	0.23 (0.08)	0.15 (0.22)
Garcinia macrophylla	2	1	188 fruits (61)	0.034	6.47 (2.07)	1.67 (0.63)	4.81 (2.16)
Grias neuberthii	2	2	37 fruits (11)	0.07	2.53 (0.77)	1.30 (0.37)	1.24 (0.85)
Theobroma subincanum	2	2	150 fruits (19)	0.07	10.34 (1.33)	5.07 (0.68)	5.28 (1.49)
Minquartia guianensis	3	3	47 doses (12)	0.26	12.16 (3.12)	1.30 (0.30)	10.85 (3.13)
Cespadezia spathulata	1	1	8 doses (4)	0.16	1.24 (0.64)	0.30 (0.13)	0.95 (0.65)
Protium sp.	11	11	19 lbs (11)	4.14	78.62 (45.54)	11.30 (4.24)	67.32 (45.74)
Total plot B net annual value							136.06 (48.82)

1 The number in parentheses is the standard error.
2 The average dose of *Minquartia* equals 120 cm^2 of bark.
3 The average dose of *Cespadezia spathulata* equals 140 cm^2.

merchantable trees on the ha and reported the stumpage values for each individual tree of worth. Summing across all merchantable trees yields an average value of USD163 ha^{-1}. We chose plot A for this valuation because it is closest to the road, thus minimizing extraction costs and maximizing stumpage values.

The NPV for the timber resources on Plot A can be calculated for a 40 year rotation length (14) using the formula $NPV=V/(1-e^{-rt})$, where V is the net value of one cutting and t is the rotation length in years. Substituting USD163 for V yields an NPV of USD189

To estimate a per ha value for cattle ranching we interviewed several area ranchers. The ranchers estimated their annual veterinary and pasture maintenance costs, and gross revenues associated with raising cattle. From these figures we calculated per ha annual net revenues for each farm of USD 2.90 ha^{-1} resulting in an NPV for cattle ranching of USD 57 ha^{-1}. Alternatively, given a carrying capacity of one cow per two hectares, 400 pounds of beef per mature cow, a 3-year maturity and a gross price of USD 1 per pound yields gross revenue per hectare of USD 200 every 3 years. Assuming that costs are about 80% of revenue, the net revenue is USD 40 every 3 years. Using the same formula as with timber, yields a net present value of USD 287 ha^{-1}. These figures for timber harvesting and cattle are reasonable considering local land prices of USD 50 to USD 220.

As Table 5 demonstrates, in the Upper Napo region of Amazonian Ecuador, nontimber forestry can provide substantial net revenues to local people when compared with the NPVs of other local land uses. The potential NPVs per ha from NTFPs are an order of magnitude greater than from any other land use. In addition, the value of NTFPs from the forest of Jatun Sacha compare favorably to revenues obtainable from agriculture in other areas of Latin America. In Northwestern Ecuador, most farmland earns less than USD 25 ha^{-1} annually, suggesting an NPV of less than USD 500 (15).

MARKET POTENTIAL AND STABILITY

This study reports the current market value of NTFPs from a specific site 30 km from market. How do these values apply to other sites? One factor which affects the value of all sites is access to markets. Across tracts currently used for NTFP collection, sites which have lower transportation costs to markets will have higher net value. Given any transportation system, there is a maximum distance where it is just barely worthwhile to harvest the NTFPs for market. At this maximum distance, the value of the forest as a source of NTFPs is zero. Over the landscape, there is a topology of land values associated with NTFPs. The NTFP values will start highest near the market and fall with distance eventually to zero. If the primary transportation is by river, values will fall slowly up the river but rapidly as one moves onto land. The more sturdy or longlasting the product, the slower the values will fall with distance.

Table 5. Comparative land NPVs.

Land use	Net present value USD
NTFP-Upland Plot A	2939
NTFP-Upland Plot B	2721
NTFP-Alluvial Plot C	1257
Local Land Prices	50–220
Agriculture	<500
Timber, Upland Plot A	188
Cattle Ranching	57–287

Table 4. Plot C valuation summary.

Species name	Number of trees	Number of trees valued	Total sustainable harvest	Price per unit USD	Gross revenue USD	Total costs USD	Net annual value USD
Batocarpus orinocensis	2	0	0	0.023	0	0	0 (0.00)
Chrysophyllum venezuelanense	3	1	7.5 fruits (4)	0.52	0.39 (0.21)	0.22 (0.07)	0.17 (0.22)
Garcinia macrophylla	2	2	793 fruits (333)	0.023	18.22 (7.66)	2.65 (0.95)	15.57 (7.72)
Grias neuberthii	2	2	24 fruits (3)	0.07	1.66 (0.21)	0.80 (0.10)	0.85 (0.23)
Inga aff. *spectabulis*	5	3	1219 fruits (306)	0.023	27.99 (7.04)	6.36 (1.16)	21.63 (7.13)
Theobroma subincanum	3	2	56 fruits (6)	0.07	3.92 (0.42)	0.51 (0.06)	3.41 (0.42)
Minquartia guianensis	1	1	8 doses (2)	0.26	2.07 (0.52)	0.40 (0.11)	1.67 (0.53)
Protium sp.	3	3	5.5 lbs (3.2)	4.14	22.76 (13.25)	3.19 (1.20)	19.57 (13.30)
Total plot C net annual value							62.87 (16.97)

1 The number in parentheses is the standard error.
2 The average dose of *Minquartia* equals 120 cm^2 of bark.

The value of the NTFPs, as with any commodity, are subject to supply and demand. If the supply of forest for harvesting were greatly expanded, prices would fall. Similarly, as existing forest is eliminated, supply should contract and prices would rise. This study measures the value of the site given existing supply conditions. It basically argues that forests which are currently being used for collection earn more than competing land uses. It does not necessarily follow that all remaining forest should therefore be used for NTFPs. Before land developers and agencies commit vast new areas to NTFP collection, they should first undertake a careful study of demand and supply.

With respect to demand, existing NTFP collection is largely devoted to serving only local demand. This could reflect a lack of interest in these products outside of the regions in which they grow or simply a lack of information. At a minimum, businessmen should be encouraged to explore the potential of expanding the markets for NTFPs both to regional cities and abroad. If there is substantial untapped demand, then it is likely that additional forests should be drawn into NTFP collection.

The results of this study also raise an important paradox. If the value of NTFPs exceed alternative land uses, why does the region seem so intent on adopting these alternative uses? There are three possible explanations. First, the relevant actors may not be aware of the potential of NTFPs. To the extent that powerful land owners and government officials come from the cities and temperate oriented cultures, they may not be aware of the potential of NTFPs. If this is the case, then the simple publication of studies such as this one should be sufficient to change their behavior. Another explanation is that forests in the Amazon tend to belong to the government. If the government is unaware or chooses to ignore that the highest use of the forest is for NTFPs, then no one will get permission to use the forest for this purpose. The collection of NTFPs may be unattractive for the government because the products generally are not exported (less visible), they are collected in dispersed locations making them hard to tax, and they currently benefit the rural poor who are not politically powerful. Third, land tenure in Ecuador requires that owners "occupy" the land. Occupation is often interpreted as removing the forest cover and planting crops. An owner who resorted to collecting products from an existing forest, stands a nonzero probability of losing his land.

Another alleged problem with NTFPs is that their markets may not be stable. The reported NPVs in this study are based on the harvest and sale of a multiplicity of products. This minimizes the potential impacts of individual product price fluctuations on the value of the forest for all NTFPs. Because there is no distinct dry season in this area of Ecuador, different forest products are available throughout the year. This also leads to overall income stability because as one product goes out of season, alternative products become available for sale. Market security is thus an asset of NTFP collection.

ADDITIONAL FOREST VALUE

While the Net Present Values calculated here represent the potential benefits from products of trees 10 cm dbh, they are not indicative of the total values of these forests for NTFPs. We do not include the value of medicinal herbs or shrubs, flowers, wildlife, tourism or the wide range of environmental services provided by intact forests, each of which could be significant in its own right. For example, one "guanta" *(Agouti paca),* a large forest rodent, is sold in the local markets for roughly USD 20.69, and decorative butterflies sell on the tourist market for a similar price. On Plot A, a medicinal liana *(Petrea maynensis)* yields net revenues of USD 9.56. In addition, these forests provide a rich array of subsistence products such as tools. thatch, food and

It is also possible to combine the harvest of NTFPs with timber extraction. In Plot A, 16 palms and 16 timber trees could be harvested to increase the NPV for the plot by 10%. Of course, if this harvesting damaged just 10% of the valuable NTFP trees, the timber harvest would only break even. Timber harvesting thus needs to be done carefully and selectively in order to be worthwhile in combination with NTFP harvesting.

DISCUSSION

Forest values depend upon many local factors such as floristic composition, site quality, disturbance history, local policy, and distance to markets. For example, at this Ecuadorian site, the upland forest is more attractive for NTFP collection than the alluvial forests. Further, it is important to note that in the three disparate sites (Peru, Belize, and Ecuador) where NTFPs have been valued, NTFP collection has consistently been worth more than alternative land uses. These results imply that harvesting , NTFPs from standing forests deserves to be considered more seriously as part of the portfolio of viable development alternatives for the world's tropical forests.

This study demonstrates the economic value of intact forest resources. Adjusting policies to create incentives for long-term forest management by local users is fundamental to the conservation and sustainable use of tropical forests. On the fragile lands of Amazonia, forests represent a vast store of wealth, provided they are managed responsibly. NTFP extraction will often be the key to sustainable management in many areas of the humid tropics.

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17. First submitted 24 June 1993, accepted for publication after revision 24 March 1994.

Contact person: Robert Mendelsohn, Yale FES, 360 Prospect Street, New Haven, CT 06511, USA

Parks & People
The Foundation for Baltimore Recreation & Parks

NUCFAC
Review Committee
1042 Park West Court
Glenwood Springs, CO 81601

Dear Madam/Sir:

The Parks & People Foundation's Community Forestry Program looks forward to working with Community Resources to develop and carry out this project to value Urban Non-Timber Forest Products in Baltimore.

Our community foresters have years of experience working with a variety of communities and community groups in Baltimore, and our networks of community forestry activists is extensive. We believe that this project will explore the values and benefits of urban forest products that have not yet been considered. We hope to use this information in two ways:

- help select species that may have products of additional value
- help residents develop green micro-enterprises

This project comes at a particularly good time for us, as we are currently running a series of workshops titled "Garden to Market" for residents interested in green micro-enterprise ventures.

We are committed to working with Community Resources jointly on this project. We will be providing community forestry time, networks and resources. We hope that you will be able to fund this project.

Sincerely,

Patricia Pyle

Patricia Pyle
Community Forester

United States Department of Agriculture | Forest Service | Northeastern Forest Experiment Station | 705 Spear St. Burlington, VT 05402-0968 (802) 951-6771 ext. 1070

3/27/98

NUCFAC
Review Committee
1042 Park West Court
Glenwood Springs, CO 81601

Dear Friends:

The Baltimore Long Term Ecological Research Project (BLTER) is a multi-year initiative funded by the National Science Foundation and supported by the USDA Forest Services (at approximately $1.5 million pei year).

We are excited about Community Resources' proposed project to research and value Urban Non-Timber Forest Products. We believe it will provide valuable information to the BLTER and to urban and community forestry professionals nationwide.

In particular, this Urban NTFP project will serve as a direct compliment to one of our projects to explore and develop urban greening micro-enterprises. BLTER has already contracted an independent micro-enterprise consultant with decades of experience to explore the feasibility of urban greening businesses. One such area we would like to explore is that of NTFPs, therefore, Community Resources proposed project will provide us with valuable information upon which we hope to build.

We are committed to sharing information, methods and resources with Community Resources for this project, and we urge you to support this research to the best of your abilities.

Sincerely,

J. Morgan Grove, Ph.D.
Research Forester, USDA Forest Service
Baltimore Long-Term Ecological Research Project

Baltimore Long Term Ecological Research Site
University of Maryland, Baltimore County
Room #252b, Technology Research Center Building
Baltimore, Md. 21227
5200 Westland Boulevard
(410) 455-6564
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CITY OF BALTIMORE

KURT L. SCHMOKE, Mayor

DEPARTMENT OF RECREATION
AND PARKS

BUREAU OF PARKS
FORESTRY DIVISION
2600 Madison Avenue
Baltimore, Maryland 21217

March 20, 1998

NUCFAC
Review Committee
1042 Park West Court
Glenwood Springs, CO 81601

Dear Sir/Madam,

As Baltimore City's Arborist for the past five years, I have worked closely with both Paul Jahnige of Community Resources and the Community Forestry Program of the Parks and People Foundation. In that time, I have observed the collection and use of Urban Non-timber Forest Products that this proposed project will study.

Baltimore City Forestry manages public trees in the City, some 300,000 street trees and 6500 acres of trees in park lands. We work closely with community groups to ensure that the urban forest meets a wide variety of needs. Our staff has decades of experience with both the trees and the people of Baltimore. Non-timber Forest Products are not something we often consider in our work, but they are products that people do collect and use (including myself as a beekeeper) and they do represent an important additional urban forest value that we often overlook.

Baltimore City Forestry will be very interested in the results of this research project. We are committed to assisting Community Resources and Parks and People in carrying out this project. I am confident that the results will be valuable and important on a local and national level.

I look forward to your support.

Sincerely,

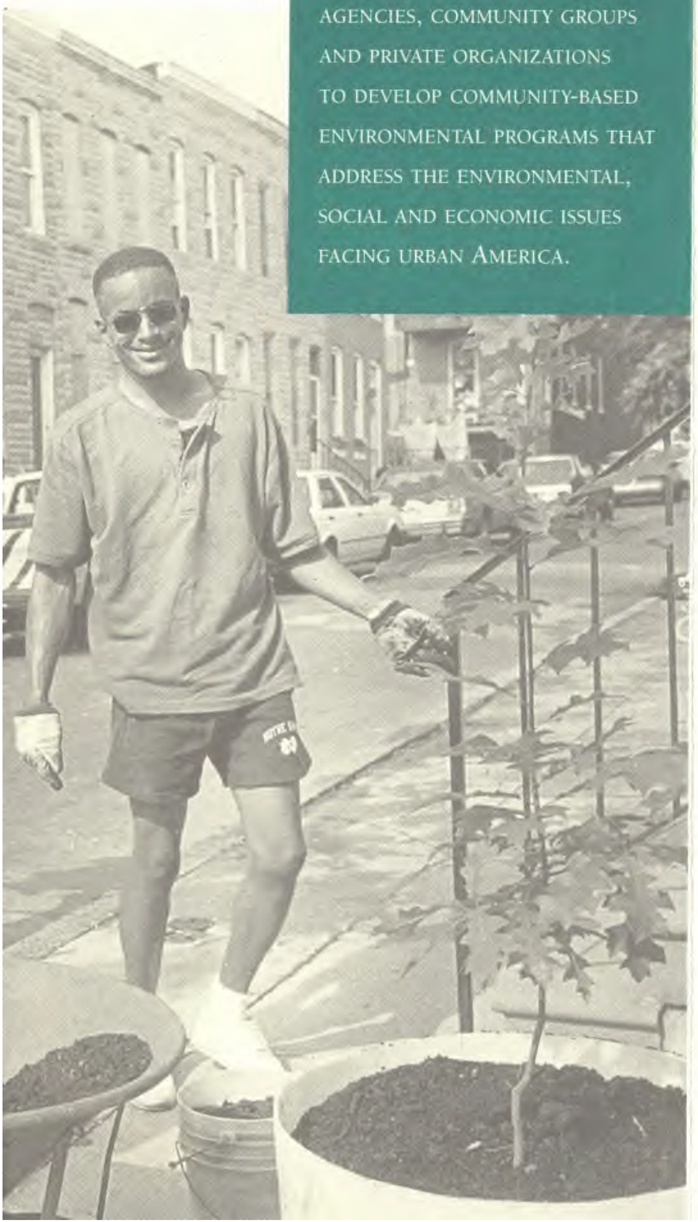
James S. Dicker

James S. Dicker
Baltimore City Arborist

Community Resources

BRINGS INNOVATIVE IDEAS, TOOLS AND EXPERIENCE, EMPOWERING URBAN COMMUNITIES TO IMPROVE THEIR SOCIAL, PHYSICAL AND NATURAL ENVIRONMENTS.

COMMUNITY RESOURCES WORKS IN PARTNERSHIP WITH PUBLIC AGENCIES, COMMUNITY GROUPS AND PRIVATE ORGANIZATIONS TO DEVELOP COMMUNITY-BASED ENVIRONMENTAL PROGRAMS THAT ADDRESS THE ENVIRONMENTAL, SOCIAL AND ECONOMIC ISSUES FACING URBAN AMERICA.



Community Resources has worked with these innovative partners in the field:

The Urban Resources Initiative
The Parks & People Foundation
Yale School of Forestry & Environmental Studies
Baltimore City Recreation and Parks
Philadelphia Fairmont Park Commission
Philadelphia Department of Recreation
Morris Arboretum

Please Support Community Resources

If you find the work of Community Resources intriguing, either personally or professionally; Please let us know!

We welcome your tax deductible contribution, or share us with a friend. Word of mouth is our best form of outreach!

community
resources

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www.communityresources.org

Promoting community stewardship to restore our urban environment.

community resources

A nonprofit

promoting

community

stewardship

to restore

our urban

environment.

Why the Urban Environment?

Imagine a city in which every neighborhood is filled with healthy street trees, attractive parks and productive gardens; where the air and water are clean; where neighborhood youth take an active role in improving their environment; and where diverse residents come together to make their city stronger through community stewardship.

America's urban environments have become our most significant ecosystems. More than 75% of us live in cities, and the condition of our urban environment affects our economy, our culture, our society, our health and our natural resources on local, regional and national scales.

Community Resources is taking action to improve this urban ecosystem.

Building on Success

We develop Model Programs in:

Community Greening

We work with community groups, other nonprofits and public agencies to create comprehensive programs that use Urban Greening as a tool for addressing a full range of urban issues from environmental restoration to job training.

Environmental Education & Training

Community Resources helps develop neighborhood-based environmental programs that allow youth to learn about and improve their neighborhood environment, and explore career opportunities in environmental fields. These programs help empower youth to make real changes in their neighborhoods and provide a positive alternative to drugs and crime.

Participatory Resource Planning

Communities must be an integral partner in successful natural resource management. Community Resources brings all stakeholders to the same table with equal status to plan natural resources programs that best meet environmental and social needs.

Monitoring and Evaluation

We provide systematic, informative and participatory monitoring and evaluation services to enhance the efficiency, equity, relevancy and sustainability of any urban environmental initiative.

Partnerships at Work

Recent Initiatives:

- Monitoring and Evaluation of the Fairmount Park Commission's Natural Lands Restoration and Environmental Education Project in Philadelphia, PA.
- Training, curricular development and monitoring and evaluation for Philadelphia Recreation's Urban Environmental Summer and After-School Programs for inner-city middle school students.
- Development of a Participatory Urban Assessment project that allows residents to control the information that describes their communities.
- Baltimore's Gwynns Falls Greenway Human Environment Inventory.
- Ecosystem Management Training.

Community Resources has recently launched its Corporate Partner Program. We would like to acknowledge Baltimore Gas and Electricity Company as our initial sponsor.

Community Resources is eager to develop new partnership initiatives with public, private and community groups in urban areas around the country, particularly in the Mid-Atlantic. As a nonprofit, we are able to offer affordable services and can help raise funds for various initiatives.