PROPOSAL OBJECTIVES AND SCOPE

Global climate change has a number of projected effects on cities. An increase in average annual temperatures combined with exacerbated urban heat-island effects will increase the intensity and frequency of extreme heat events (Stone et al. 2010). As weather patterns become more unpredictable, extreme precipitation events will force cities to deal with unprecedented volumes of storm-generated runoff and flash floods (Allen & Soden 2008). Urban trees and tree-planting programs can help moderate heat-island effects and extreme heat events (EPA 2008; Kurn et al. 1994) and manage stormwater flows (Nowak 2006). Climate change will also impact the quality of life in cities and urban areas. The uncertainty and unpredictability of the effects of climate change in cities will make human adaptive capacity even more important perhaps than the moderating effects of trees. Adaptive capacity (see Appendix, Part A for expanded definitions of underlined words), or the ability to respond to change and manage disturbances, is fostered by high amounts of social capital and norms of trust and reciprocity, which contribute to a community's ability to act collectively toward a shared goal (i.e., collective action; Adger 2003). Community tree-planting projects, as a form of collective action, may have potential to build social capital in neighborhoods (Elmendorf 2008) and thus increase their adaptive capacity for grassroots climate change mitigation, adaptation, and coping in cities (Adger 2003). Understanding how communities and neighborhoods in cities collectively organize for positive change (i.e., to plant and manage trees in their neighborhoods) can help urban foresters, planners, managers, and policy makers understand how tree planting may catalyze other types of collective action, including those directly addressing climate change.

Additionally, tree survival and growth in highly heterogeneous urban environments are not well studied (Iakovoglou et al. 2001). Existing research on urban tree growth has generally been reductive in approach, focusing only on biophysical factors and ignoring social factors, or on the impact of certain types of management while controlling biophysical constraints (see Appendix, Part A: Literature Review and references therein). In contrast, successful or sustainable natural resource management in rural areas is theorized to be influenced by three types of variables comprising a social-ecological system (SES): (1) biophysical or environmental attributes, (2) community characteristics, and (3) institutions and management practices (Ostrom 2009a). This SES framework (Ostrom 2009a) is similar to the Clark et al. (1997) model of sustainable urban forestry that purports that a successful urban forest comprises a healthy vegetative resource, supportive community, and adequate management efforts.

Motivated by these frameworks, this grant proposal requests money for the establishment of an interdisciplinary, collaborative, multi-city research program that combines the SES framework (Ostrom 2009a) and the Clark et al. (1997) model to evaluate the outcomes of urban tree-planting programs in the face of climate change (Figure 1). Past NUCFAC projects related to climate change have focused on the preparedness of the urban forest for climate change, storm response measures, and assessing the carbon-offset capacity of urban forests. Our project uniquely extends to the preparedness of the urban *community* for climate change. Our proposal seeks to evaluate both the direct effects (successful urban trees, i.e., healthy, fast-growing, providing optimum benefits over time) and the indirect effects (engaging neighborhoods and individuals in tree-planting programs and other environmental stewardship projects) of urban tree-planting programs run by nonprofit organizations in eight cities across the USA (Figure 2).

Tree-planting organizations around the country collect a variety of data about the trees they plant through neighborhood- or community-initiated volunteer tree-planting programs (such as Alliance for Community Trees' NeighborWoods program). However, most organizations do not have the resources to use these data to measure planting success rates (measured by mortality and growth rates), much less evaluate potential indirect effects of their tree-planting programs. A

set of simple protocols that tree-planting organizations could use to assess both the mortality and growth rates (success) of the young trees over time, and any neighborhood- or individual-level indirect social effects would (1) help close the gap between desired knowledge and existing practice; (2) generate data for a national-scale assessment of community tree-planting program outcomes in the face of climate change; and, (3) inform best practices for volunteer tree-planting programs and other types of active urban environmental stewardship.

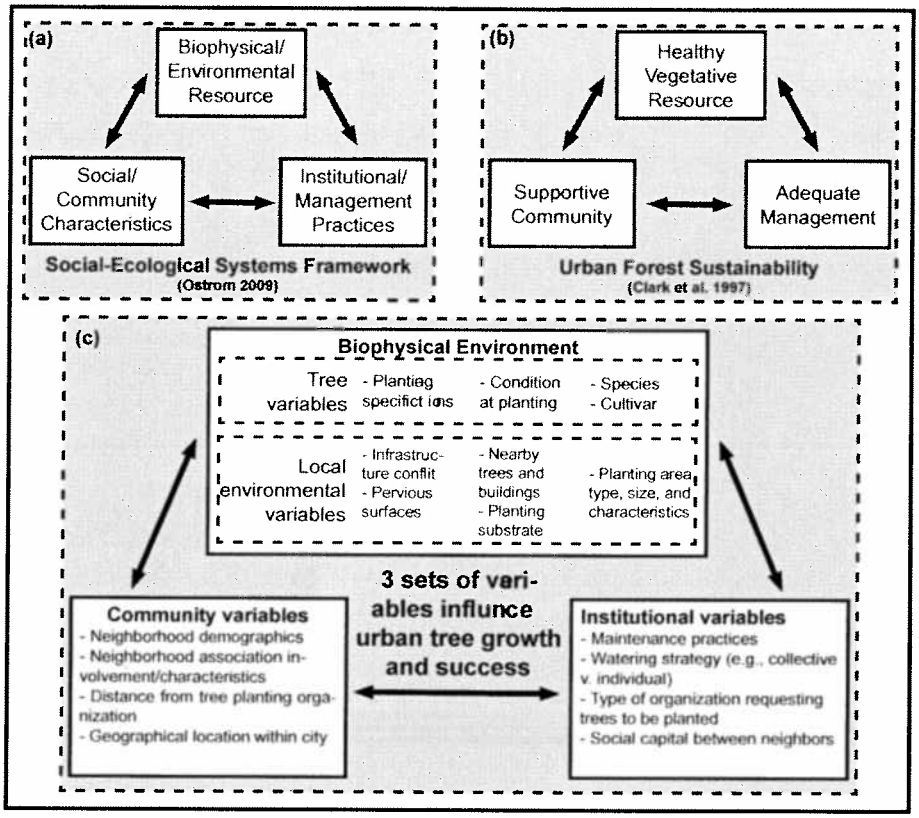

Figure 1. (a) The social-ecological systems (SES) framework (Ostrom 2009a). (b) The urban forest sustainability model (Clark et al. 1997). (c) Our methodology combines elements of both to consider three sets of factors that contribute to high levels of urban tree success and growth.

We seek to expand the research we are piloting in Indianapolis, Indiana, with Keep Indianapolis Beautiful, Inc. (KIB). This research evaluates the success of the trees KIB planted in cooperation with neighborhoods in 2006 (Vogt et al. 2011) as well as the indirect effects of these plantings on local collective-action efforts, civic engagement, and individual environmentally significant behaviors. This research is in the process of developing two data protocols: a re-inventory protocol for young trees to assess the survivorship and growth of community-planted trees over time, and a social data protocol to assess the indirect effects of tree-planting programs on the people and communities involved. We propose to parallel our Indianapolis research methods by using our protocols to collect data about similar tree-planting programs in eight cities across the USA. This will enable us to test the robustness and applicability of our two data protocols across different urban contexts and to begin to conduct long-term, comparable evaluations of urban tree-planting program outcomes in different cities. The data collected through this research will be compiled into a multi-city database of

community-planted trees that can help us understand how growth and survival of urban trees over time may be altered across geographically and climatically distinct cities as the climate changes (see also Expected Outcomes section).

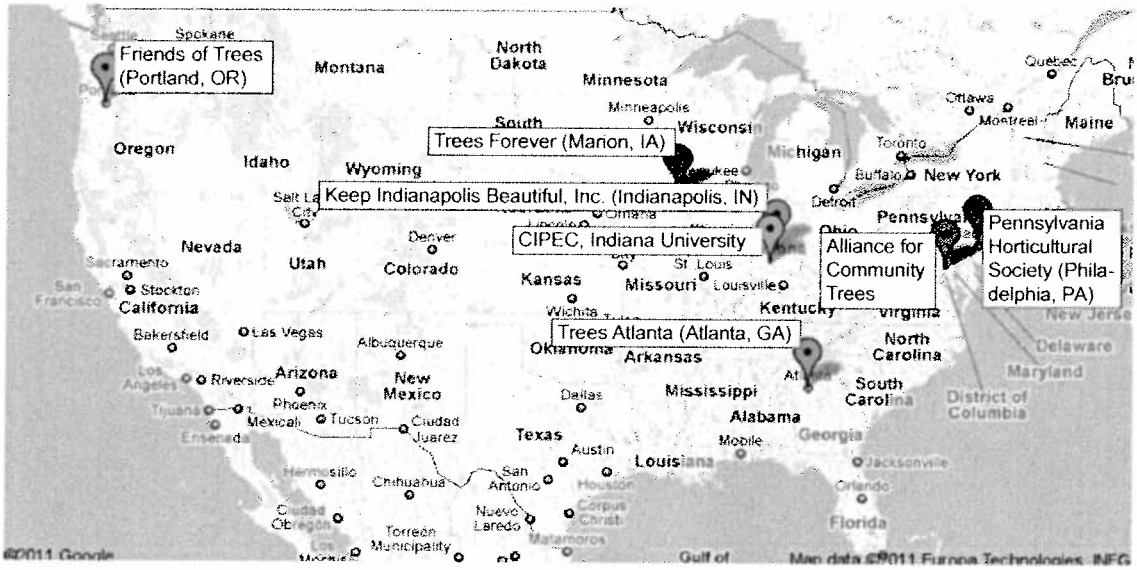

Figure 2. Nonprofit partners (blue) and main investigators (red). Three additional partners are to be determined. *Source:* Base map from Google Maps, http:// g.co/maps/fnmu6

Research Questions

Two overarching research questions have guided our investigations and will guide the proposed research:

1. What are the social-ecological (biophysical/environmental, social/community, and management/institutional) characteristics that predict urban tree success (survival, establishment, growth, and condition)?
2. What are any indirect social effects (at the individual or neighborhood level) of participation in voluntary, neighborhood-initiated tree-planting projects and how could these relate to climate change adaptation initiatives?

The first question relates to understanding the ways that tree-planting programs can maximize the *direct effects* of the program: successful urban trees. Specific questions to be answered will address the three facets of the social-ecological system: (1) Vegetative resource and biophysical factors: What types of trees planted (e.g., planting stock, species) are the most successful under various urban growing conditions? What effect do various local environmental factors (soil volume, light availability, competition with other trees, etc.) have on tree success? (2) Community and social system attributes: What characteristics of the neighborhood (social/cultural, economic, demographic, etc.) are related to tree success? (3) Institutional and management practices: What role does management and maintenance (e.g., watering, pruning, etc.) at the neighborhood level play in tree success? What management institutions (i.e., rules-in-use, norms) are the most important to tree success?

The second research question relates to the *indirect effects* of tree-planting programs by asking about the social effects of these programs. This question considers tree-planting programs from a different direction than the first question, and instead of asking "How do characteristics of the community impact tree-planting success?" we ask, "How does tree planting impact the

characteristics of the community?" The theoretical justification behind this question is based in theories that collective action—tree planting, in this case—may impact other forms of collective action taken by the neighborhood or other characteristics of individuals, such as a sense of neighborhood ownership or engagement in civic environmentalism (Elmendorf 2008), or adaptation to climate change (Adger 2003). Previous studies have examined the effects of *trees themselves* on community dynamics (e.g., crime and violence; Kuo & Sullivan 2001a,b) and on "user satisfaction" of trees planted (Sommer et al. 1994b:323). However, few studies have explicitly examined the indirect social effects of *tree-planting programs* on communities or individuals. We intend to search for specific, quantifiable effects of urban tree-planting programs and consider how these effects can be related to climate change adaptation strategies.

ORGANIZATION/METHODOLOGY

This proposal seeks funds to expand our research on the questions above to multiple cities via application of the young tree re-inventory and social indirect-effects protocols that we are developing. The mixed-methods research we propose incorporates a combination of quantitative and qualitative survey, field, and geographic information science methods to gather data and perform analyses. Such mixed methods are critical to successfully analyzing complex systems with both social and ecological components (Poteete et al. 2010).

Young Tree Re-Inventory Protocol

The young tree re-inventory protocol (hereafter tree protocol) we have developed gathers two categories of variables: (1) tree-related variables, and (2) local biophysical and environmental variables, including management and social variables necessary to gather at the location of the tree, e.g., tree care indicators and evidence of pruning/mulching/staking. Table 1 lists each variable in the tree protocol. Where applicable, the data-gathering methods for each variable conform to the data collection standards under development by the U.S. Forest Service's Urban and Community Forestry Program, the International Society of Arboriculture, and the International Union of Forestry Research Organizations (USFS/ISA/IUFRO 2010).

Table 1. Variables included in the young tree re-inventory protocol methods.

Tree variables		Local environmental variables
Species*	Crown dieback*	Planting area type*
Diameter at breast height (cm)*	Infrastructure conflicts (P/A)*	Planting area width and length (m)
Caliper (cm)	Root flare (P/A)	Distance to the curb (m)
Total height (nearest 0.5 m)*	Mower damage (P/A)	Distance to nearest building (m)
Height to live crown (nearest 0.5 m)*	Pruning (correct/incorrect/none)	Height of nearest building (m)
Crown exposure*	Mulching (correct/incorrect/none)	Ground cover at base of tree*
Chlorosis (P/A)	Staking (correct/incorrect/none)	Ground cover under canopy*
Insect damage (P/A)	Other damage (P/A)	Care indicators (bench, bird feeder, yard art, trash)
Rusted leaf tips (P/A)	Overall condition (good/fair/poor/dead/stump/absent)	Trees in 9 and 20 m radii
Other discoloration (P/A)		Trees in same planting area
Mold or mildew (P/A)		

* Variables align with standards under development by USFS/ISA/IUFRO (2010).
P/A, presence or absence of a given variable.

Social and Indirect Effects Protocol

The social and indirect effects protocol (hereafter social protocol) we are developing gathers additional data on community characteristics and management/institutional factors. The social protocol relies on a combination of observations by data collectors, interviews and surveys of

tree-planting participants and local nonprofit employees, and data obtained from the U.S. Census for blocks within which tree-planting projects fall.

The full social protocol will be developed with requested funds (see Appendix, Part B: Budget & Funding) and will be informed by pilot social research occurring with Keep Indianapolis Beautiful, Inc., during summer 2012. Three main components comprise the social protocol:

1. *A structured survey of organizational staff* to collect standard information about the tree-planting programs and organizations. Questions will ask about program structure, tree-planting activity specifics, any fees charged to program participants for membership or trees, etc., and will help us assess key similarities and differences among tree-planting programs across cities that may affect both direct and indirect program outcomes.
2. *Semi-structured informal interviews with key tree-planting project informants* (identified neighborhood tree-planting project managers, participants, organization employees, and other individuals identified through a snowball approach) to establish a qualitative understanding of tree management and effects on biophysical and social outcomes and collect information about neighborhood-level indirect effects (see Table 2 for a list of sample questions). Semi-structured interviews will also make use of participatory action research methods, whereby interviewees delineate the boundaries of their neighborhoods and of the neighbors who participated in tree-planting activities.
3. *Structured surveys of a sample of tree-planting project participants* to collect data on individual-level indirect effects. This data will be gathered in two steps. First, a pre-measurement survey instrument will be included in the tree-planting application to gather data on individual-level civic engagement (e.g., participation in clubs/local social groups; voting practices; church attendance), environmental attitudes, and personal characteristics (e.g., education, income, gender). A second survey will gather post-program data at the individual level after tree-planting activities have occurred. Questions in the follow-up survey will assess individual behaviors related to private and public tree management (e.g., watering, pruning, mulching practices), civic engagement (e.g., joining other community groups), environmental attitudes/awareness, etc. Follow-up questions will be compared to baseline questions to measure any changes in behaviors and attitudes before and after tree planting. Follow-up surveys will be distributed according to the Dillman Tailored Design method (Dillman 2000).

Data gathered via these formal protocols will be supplemented by observations made by data collectors in the field, including signs indicating evidence of neighborhood collective action (e.g., crime watch, adopt-a-block, neighborhood meetings), evidence of neighborhood self-identity (e.g. neighborhood name signs), vacant/boarded-up houses on blocks where trees are planted, and more general observations of neighborhood condition, etc.

Table 2. Sample semi-structured interview questions. Data collected will allow researchers to determine the key variables influencing success in tree planting and potential indirect effects.

Sample semi-structured interview questions
1. Please tell us about this history of your neighborhood. For instance, when did it form? What initiated its formation? Have there been any major problems/successes in the past?
2. Had your neighborhood acted collectively prior to the tree-planting project you participated in in [year]? If so, what kinds of activities? For instance, crime watch, block parties, etc.
3. Has your neighborhood acted collectively since the tree-planting project in [year]?
4. In what ways do individuals/the group manage the trees (watering, mulching, pruning, etc.)? How do you conduct/engage in these activities—individually, collectively?
5. Have you noticed any changes in yourself (i.e., your behavior, your interactions with other community members) since the tree planting? Describe any changes.

Human Subjects Research and Confidentiality

This research, as it concerns human subjects, will be subject to review by the Indiana University Institutional Review Board Human Subjects Committee (IRB-HSC), and must be approved before any data can be collected via the social protocol. As also required by IRB-HSC, all investigators and graduate research assistants (GRAs) will complete Collaborative Institutional Training Initiative Social/Behavioral Researchers Stage 1 training for exempt research concerning human subjects prior to performing semi-structured interviews. Data concerning neighborhoods, planting projects, and individuals will be kept anonymous by assigning neutral pseudonyms to neighborhoods and planting projects, and random numbers to individuals. Individual-level data will be displayed only in the aggregate in results, as a further measure of protecting individual privacy. Data will be stored on secure Indiana University Bloomington (IUB) servers and computers at the Center for the Study of Institutions, Population, and Environmental Change (CIPEC) at IUB (IU 2011).

Existing Data from Nonprofit Organizations, U.S. Census, and Spatial Datasets

The data obtained via the tree and social protocols will be combined with existing data maintained by the nonprofit organizations running the tree-planting programs. Maintenance of minimal pre-existing data was a necessary condition for organization selection and partnership at this point in our research. Future stages of our research could entail creation of a data collection protocol to enable organizations to begin collecting data at the time of planting. Existing data available from nonprofits include details on trees at planting (e.g. size, species), planting location (e.g. GPS or street address), and contact information for the neighborhood group/individuals who initiated the tree-planting project. Tree protocol data will be matched with existing tree-level data from planting to generate measures of tree growth since planting and calculate mortality rates. To gain a better picture of local environmental parameters that may influence tree growth and survival, several spatial features will also be used in data analysis, including road width (number of lanes), traffic volume, road salting frequency, property/parcel age, house setback, zoning type, and other features as relevant given city context and spatial data availability. These features will be assigned to individual trees. Data from the U.S. Census will be used to assess demographics and socioeconomic characteristics (household size, median household income, median educational attainment, etc.) as a neighborhood-level effect on tree success and indirect effects.

Analysis

Tree growth and survival analysis: We will use econometric techniques to estimate the effects of social-ecological variables on the growth, survival, and condition of community-planted trees. We propose to build a multivariate model of tree growth rate, a logit model of the probability of tree survival, and a multinomial logit model to predict tree condition. Fixed effects models will be used to capture effects of neighborhood-level variables (e.g., socioeconomic characteristics as obtained from census data and semi-structured interviews).

Indirect effects analysis: We will use textual analysis to extract data of neighborhood characteristics from the semi-structured interviews. These data will be combined with data on the tree-planting application forms, data from interviews with the implementing organization, and data on individual perceptions of trust, environmental awareness, and community involvement (gathered from the individual-level survey). Our hypotheses that the collective tree-planting action of a neighborhood increases community social capital and that it increases instances of community collective action can be tested econometrically through a combined dataset drawing from the survey instruments.

In addition to a broader econometric analysis, case study methods will be used to describe in greater detail the particular projects and take advantage of the rich, semi-structured interview

data. Describing the features that characterize each tree-planting project in the form of a case study will enable us to compare project success and effects within and across cities. Use of interview data and participant survey data will provide a means of contextualizing variation among the cases (neighborhoods) within and among the eight tree-planting programs, providing important descriptive and correlative statistics for use in comparing cases. From this, a comparative typology of collective tree-planting strategies and indirect outcomes will be produced. Such a typology has the potential to positively influence tree-planting program management, and, at the neighborhood level, tree-planting success and neighborhood collective-action efficacy.

COLLABORATION AND PARTNERSHIPS

Application of Protocols to Eight Cities with Urban Tree-Planting Programs

In partnership with the Alliance for Community Trees (ACTrees) and Keep Indianapolis Beautiful, Inc. (KIB), we have identified several cities across the USA with urban tree-planting programs that are suitable for expansion of our research program through application of the two protocols; five of these tree planting organizations have committed as partners in this proposal, and we are in discussion with several more. See Table 3 for a brief description of the organization and tree-planting program of interest in each partner city. To implement the tree and social protocols in each city, funds requested in this proposal will be used to hire graduate research assistants (GRAs) to manage a small data collection team (a "tree team" of 3–4 individuals hired by the local nonprofit organization; see Appendix, Part B: Budget & Funding). GRAs will train and organize the tree team to collect the tree protocol data independently, while the GRA themselves will conduct semi-structured interviews via the social protocol. All GRAs will be selected, overseen, and trained by the managing research team at Indiana University, Bloomington (IUB; composed of investigators listed in this proposal). Training will occur during a two-day training seminar and opening workshop at KIB in Indianapolis (see Appendix, Part B: Budget & Funding), in order to minimize experimenter bias during data collection. Social survey administration (creation, mailing, etc.) will be managed by the IUB research team. Data collection will occur from approximately May to August 2013, with data analysis and report writing occurring the following fall and winter. Data analysis and database management will occur at CIPEC (see Appendix, Part C: Personnel & Organizational Capacity).

Table 3. Brief descriptions of tree-planting programs selected for evaluation. Five partners have committed; three additional partners are still in the discussion phase.

Nonprofit	Tree-planting program name and description
Keep Indianapolis Beautiful, Inc. (KIB)	NeighborWoods Program (supported by ACTrees): Groups of neighbors apply for a tree planting to occur in their neighborhood. In order to receive 1" caliper trees, the neighbors must gather sufficient volunteers to participate in the planting and agree to water the trees once a week for two years after planting. KIB also plants trees in public right-of-way and public spaces. Part of KIB's plantings occur in disadvantaged and underserved areas with low present tree cover, as determined by their "hotspots" analysis conducted in 2006 (Wilson & Lindsey 2009).
Pennsylvania Horticultural Society (PHS)	PHS Tree Tenders is a training program that empowers invested residents restore and care for their local tree canopy. Tree Tenders offers hands-on tree care training for residents of the five-county Philadelphia region, including tree biology, identification, planting, proper care and working within your community. The work of Tree Tenders contributes to Plant One Million, a regional partnership led by PHS to plant one million trees throughout 13 counties in southeastern Pennsylvania, New Jersey, and Delaware, to restore the tree canopy cover in the region to 30 percent.
Trees Forever –	NeighborWoods-Des Moines: The NeighborWoods program works with residents to

Nonprofit	Tree-planting program name and description
various cities in Iowa and Illinois	green neighborhoods and parks in Des Moines. The program provides full funding and technical assistance to individuals or neighborhood/community groups for tree-planting projects including parks, schools, residential, and community buildings.
Trees Atlanta	NeighborWoods-Atlanta (supported by ACTrees): Any neighborhood within Atlanta is invited to host a project. Neighborhoods with low canopy cover or greenery and willing to maintain the site are given priority. They are expected to provide volunteers to help plant, must have created a plan for how to water and mulch the trees, and be in need of at least 30 trees. Starting in 2011, all of their trees are watered by staff.
Friends of Trees. Portland, OR	Neighborhood Trees Program/Plant It Portland!: Neighborhood coordinators initiate tree plantings in a neighborhood by talking to neighbors about planting trees, helping neighbors order their trees via an online system, and working closely with Friends of Trees staff to organize a planting event. For $35 to $75, a resident receives an 8' to 12' tall tree, delivery, hole digging, planting assistance, mulch, stakes, and follow-up maintenance checks.

Project Management and Partner Responsibilities

A project manager (Ph.D. student at IUB), overseen by the Principal Investigator, will be responsible for primary communication between partners and the research team at IUB (see also Appendix, Part C: Personnel & Organizational Capacity). Partner organizations in each city will (1) provide information about the trees they have planted through volunteer, neighborhood-initiated tree-planting efforts, as well as the neighborhoods that have solicited the tree-planting projects; (2) attend an opening workshop meeting of all partners and researchers hosted by KIB in Indianapolis, IN (see Appendix, Part B: Budget & Funding); (3) purchase approximately $3,000 of standard equipment for data collection; and (4) hire and pay a data collection team of 3–4 individuals for one summer. These efforts are considered the organizations' matching funds (see Appendix, Part B: Budget & Funding).

DELIVERABLE PRODUCTS

Tangible products we expect will result from the proposed research include the following:

1. *Tree-planting program outcome evaluation protocols:* Finalized, field-ready tree and social data collection protocols for dissemination to any nonprofit organizations or cities implementing tree-planting programs and interested in evaluating the outcomes of their programs. Wide-scale implementation of these protocols in the future could enable unprecedented national-scale assessment of urban tree-planting efforts.
2. *Community-planted trees database:* A database containing an inventory of community-planted trees in eight cities in the USA will provide a baseline for tracking these trees into the future and assessing long-term growth rates and survivability. This database will also be used to track the quantitative effects of climate change on the growth and survival of trees in cities. This database will be housed on secure, Indiana University servers and made available to partner organizations and other interested parties on request. We will also investigate creation of a live, online tree database to which organizations can upload their tree data and have on-the-spot access to all other organizations' tree data, which would enable broader analysis of the database by interested third parties, including climate change researchers.
3. *Peer-reviewed journal articles and conference presentations:* Scholarly journal articles (in, e.g., *Arboriculture & Urban Forestry, Urban Forestry & Urban Greening, Urban Ecosystems*) and presentations at national conferences (e.g., International Society of Arboriculture, Ecological Society of America urban ecology sessions, Association for Public Policy Analysis & Management environmental sessions) detailing results of our evaluations

of urban tree-planting programs in eight U.S. cities. Initial analysis will answer the research questions stated in the Proposal Objectives and Scope – Research Questions section. Upon completion of the community-planted trees database (see number 2 above), published work will analyze the quantitative effects of climate change on the growth and survival of trees in cities.

4. *Final reports and fact sheets:* A report and a fact sheet will be given to each partner organization, summarizing their tree-planting program outcomes. These may be useful to the nonprofit organizations in conveying information to current donors, stakeholders, and volunteers, as well as for tapping into a new class of donors that may be more interested in the social consequences or adaptation-building potential of neighborhood collective action rather than in simply planting trees. Together, the reports will comprise a set of comparable case studies of urban tree-planting programs that could be used to answer new research questions in the future (e.g., looking at the different types of collective action in which neighborhoods engage in addition to tree planting, analyzing how climate change impacts changes in urban tree-planting programs over time).

Beyond tangible products, we expect the research proposed here to significantly contribute to researchers' and practitioners' understanding of the success of urban tree-planting programs and of the direct and indirect effects these programs have both on the tangible urban environment (i.e., the urban forest) as well as on the people and communities engaged in the tree plantings. Our research will also contribute to the growing understanding of collective action in communities and will ideally inform not only urban foresters but also planners and policy makers regarding how to encourage collective action and coproduction of urban services (environmental and otherwise; Ostrom 2009b) in the face of the unpredictability and uncertainty posed by climate change.

NATIONAL DISTRIBUTION AND TECHNOLOGY TRANSFER

The main outcome of this project will be robust, tested data collection protocols that enable evaluation of social and biophysical tree-planting program outcomes (see also Deliverable Products section). The tree protocol and the social effects protocol could be packaged together and disseminated freely through ACTrees, state urban and community forestry coordinators, and/or USDA Forest Service field and research stations (i.e., through email and direct mail to entities, and available for use on their websites). Application of the tree protocol in particular could enable nonprofit organizations or cities to rapidly assess the survival and growth of their recently planted trees as a minimal program evaluation effort. This protocol could be used to generate discussion of best practices for tracking the survival and growth of young trees in cities throughout the country. Additionally, if funded, this project could extend the evaluation of tree-planting programs to other cities through organizations and even municipalities, in the hope of expanding the community-planted trees database. This expansion would allow spatial and temporal analysis at various scales, with large sample sizes. No such pool of urban tree data currently exists, and such data represent a potentially invaluable tool for analyzing the impacts of climate change on urban forest within the USA.

Scholarly journal articles, professional papers, and fact sheets discussing the results of this research and the protocols might be found through electronic searches that include any of the following key words/phrases: collective action, models of urban tree growth, neighborhood-initiated tree planting, social-ecological factors influencing tree growth, social-ecological systems, social benefits of trees/tree planting, indirect effects, tree-planting program evaluation/assessment/outcomes, urban tree planting, urban tree growth/mortality/survivorship, and other similar terms. These reports, particularly the fact sheets, will be useful to urban policy makers, planners, and urban foresters, and may help spur investment in urban tree-planting programs.

PROJECT EVALUATION CRITERIA

Evaluations of the success of our project will be based on whether the project activities are completed on time (Table 4), and—more importantly—the extent to which our results reach stakeholders and target audiences (see Deliverable Products above). Specifically, the indicators in Table 5 will be used to evaluate project success. Although true project performance is difficult to measure (particularly a project that aims to assess and eventually impact social outcomes), we believe that the indicators listed capture the major features of the project.

Table 4: Project timeline

Personnel	Activity	Target Date
GRAs	Hired and trained	1 May 2013
Partners	Opening workshop	Spring 2013
Partners	Hire temporary data collection teams	1 May 2013
Data collection teams (with GRA supervision)	Data collection (2,000 trees per Partner) & submission	May–Sep 2013
	Submit progress report to NUCFAC	Sep 2013
	Multi-city community-planted trees database complete	Jan 2014
	Data analysis completed	May 2014
	Final data collection protocols and city-specific reports disseminated	May 2014
	Presentations at conferences and working meetings (ISA)	2014
	Submit final report to NUCFAC	May 2014

Table 5: Indicators of project success

Indicator	Goal
Short-term indicators	
1. Number of tree-planting participants interviewed per partner organization.	20
2. Number of surveys completed and returned per partner organization (response rate).	100 (30%)
3. Number of trees inventoried and included in community-planted trees database.	16,000 trees
Intermediate-term indicators	
4. Number of successful (accepted for publication) articles emerging from the results of the project.	At least 3
5. Number of fact sheets distributed to volunteers, participants, and donors by each partner organization.	200
Longer-term indicators	
6. Number of annual requests for the use of the community-planted trees database.	2 requests
7. Number of additional ACTrees member organizations expressing interest in future participation in further extension of the research proposed here.	10 in 3 years

APPENDIX

Part A: Literature Review

Literature from a variety of disciplines is important to understanding the theoretical basis of our proposed research: (1) tree growth and survival literature; (2) existing research on social benefits of tree planting and urban greening; (3) theory on collective action, social capital, and the co-production of urban services; and (4) literature on climate change and adaptive capacity in cities and the role of trees and tree planting in mitigation and adaptation.

Box A1. Definitions of key terms from the social sciences in the context of our research.

Adaptive capacity: the ability of a community to respond to and manage change or disturbances, both exogenous and endogenous; highly linked to trust and reciprocity, and the strength of relationships between individuals (Adger 2003); an example is neighbors deciding to build a small cooling shelter in a neighborhood park to cope with the increasing frequency and magnitude of extreme heat events as a result of climate change.

Collective action: actions undertaken by a collective, or group, toward some sort of mutually or jointly beneficial outcome (Adger 2003; Ostrom 2005; Ostrom 2009b); examples include a neighborhood working together to create a crime watch group that provides public safety services to the neighborhood, or a neighborhood association organizing on a Saturday to water all the newly planted street trees on their block.

Coproduction: provision or maintenance of a public good or service when contributions by more than one group (often sectors, such as nonprofit, private and/or public) are necessary to achieving an optimal outcome (Marschall 2004; Ostrom 1996); an example is the provision of the urban forest by tree-planting nonprofit organizations, individual citizens, and the municipality.

Civic ecology activities: efforts undertaken by individual residents to improve the natural urban environment that have human health and well-being benefits as well; examples can range from activities as simple as raking the yard or planting a tree to constructing a neighborhood pocket park.

Civic engagement: Participation in discussion and/or addressing issues of general public concern; also called *citizen participation*; examples include voting or participating in an election, joining a parent-teacher association or crime watch group, discussing community health issues with a neighbor.

Direct effects: impacts or outcomes of a program or activity that result from the activity that occurs; for instance, a probable direct effect of tree planting programs is a tree planted in the ground that survives and grows.

Indirect effects: Impacts or outcomes of a program or activity on aspect other than those that the program or activity directly influences; for instance, urban tree-planting programs physically plant trees, but byproducts of this tree planting may include effects on the community or individuals beyond those conveyed by the physical act of planting a tree.

Institutions: rules, norms, and strategies that constrain human behaviors (Ostrom 2005); examples in the urban ecology setting include municipal laws concerning yard and lawn upkeep, norms of tree pruning or shrub aesthetics, and property rights that constrain the activities of individuals on public and private property.

Social capital: networks of relationships and interactions between individuals or between groups of individuals that enable fulfillment of daily human physical and emotional needs; *bonding* social capital refers to the strength of ties between individuals within groups; *bridging* or *networking* social capital refers to the strength of bonds across different groups (Adger 2003; Putnam 2000).

Social-ecological system (SES): a system in which human (social) and natural (ecological) components are highly interrelated and operate inseparably from one another, thus, the dynamics of the system cannot be separated into an analysis of its component parts; the *SES framework* (Ostrom 2009a) is a method for describing the interactions between the many variables within each of the three components of the SES: biophysical environment, community characteristics, and institutions.

Tree Growth and Survival

Most research on tree success in urban areas has focused on factors related to mortality or survival rates (e.g., Lu et al. 2010; Nowak et al. 2004; Thompson et al. 2004), while fewer studies have also considered growth rates. Existing research on urban tree growth has generally been reductive in approach: studies either focus on the impact of individual biotic and abiotic (biophysical) factors, while ignoring management or social factors (e.g., soil properties: Grabosky & Gilman 2004, Jim 1998; microclimate: Kjelgren & Clark 1992; water relations: Close et al. 1996, Graves 1994, Whitlow et al. 1992; and, restricted rooting space: Cermak et al 2000, Grabosky & Gilman 2004, Kopinga 1991), or focus on the impacts of certain types of management regimes on urban trees while controlling biophysical constraints (e.g., pruning: Fini & Ferrini 2011; compaction remediation: Day et al. 1995; soil amendments: Gilman 2004; and transplant practices: Watson 2005, Neal & Whitlow 1997;). Additionally, many of these studies have been conducted in 'laboratory' settings as true experiments, rather than as natural experiments in the urban environments. Exceedingly few studies attempt to comprehensively measure the combined effects of biophysical and management factors on tree success, much less combine social and community characteristics with these biophysical factors. One exception is the recent study by Lu et al. (2010) of the influence of local biophysical factors (urban design, biological condition, etc.) and social factors (e.g., a weeded tree plot as evidence of tree stewardship) on the mortality rates of young street trees in New York City. This study suggests the importance of future research in urban social-ecological systems for understanding the full picture. Apart from this recent endeavor, few studies have attempted to fully capture the social, biophysical and management factors influencing tree success across multiple cities, as our research proposes.

Social Benefits of Tree Planting and Urban Greening

While existing tree success research may be reductive, the indirect effects of tree-planting programs are even less explored. Sommer et al. (1994a,b) have evaluated the "user satisfaction" with trees planted in residential yards. They found that residents who planted their own tree were more satisfied with the outcome than residents whose tree was planted by outside parties (Sommer et al. 1994a), and that residents who engaged in group plantings were more satisfied with the outcome than residents who planted a tree by themselves (Sommer et al. 1994b). This same research group has also measured the attitudes of tree-planting program participants and non-participants toward trees and neighborhoods. Summit and Sommer (1998) revealed that participants were more satisfied with tree location, staking, maintenance quality, and neighborhood quality than non-participants in tree-planting programs. Outside of and since this research group, no systematic, quantitative research has been done to evaluate urban tree-planting programs from a social perspective. Elmendorf (2008) cites an extensive literature from urban planning and community development research, outlining the theoretical linkages between

trees, tree planting and community capacity building; yet, to our knowledge, no studies have explicitly analyzed the effects of tree-planting programs on community adaptive capacity or collective action.

A related field of research concerns social and institutional motivations for urban greening efforts. Grove et al (2006), for instance, used remote sensing methods to compare social characteristics with vegetation structure in Baltimore, as part of the Baltimore Ecosystem Study. Additional research in this field has examined community and private gardens and lawn care. Larson et al. (2009) examined lawn management in Phoenix, Arizona, to understand how social and cultural norms or legacies impact urban landscapes. According to Robbins and Sharpe (2003), upholding aesthetic norms, the fear of neighborhood sanctions, and property values are key drivers to understanding front yard maintenance. While not directly related to tree growth or survival, this field can inform the social and institutional variables that will be analyzed in the proposed research.

Collective Action, Social Capital and Co-Production

Compared to theories of urban vegetation distribution and provision, theories of collective action in the provision of conventional urban services (e.g., policing, education) are much more developed. Collective action (see Box A1) has been linked to the existence of both bonding (within-group) and bridging (across-groups) social capital (Adger 2003; Ostrom 1996). Social capital, as a measure of the strength and networks of interactions between people, involves trust and reciprocity (Adger 2003), elements that are also key to successful collective action (Ostrom 1996). Collective action and social capital are important concepts in understanding situations behind coproduction of urban services (Adger 2003; Marschall 2004; Ostrom 1996, 2009b). For instance, studies by Ostrom and colleagues in the 1960s on urban policing demonstrated that citizen involvement in the provision of policing services yielded enhanced delivery of services (cited in Ostrom 2009b). Marschall (2004) looks at citizen awareness of and participation in the coproduction of public safety and schooling efforts and finds that participation in these activities is related to involvement in both formal and informal associations (collective action). This literature indicates reason to suspect that participation in tree-planting activities may have effects on other types of civic engagement.

Climate Change, Adaptive Capacity and Tree Planting

Collective action, social capital and the trust and reciprocity required therein are also critical to a community's adaptive capacity. Adger (2003) argues that adaptive capacity can make a community more capable of coping with the potential change and uncertainty posed by climate change as well as adapting to other adverse circumstances. In marginalized communities in particular, argues Adger (2003), where the established social order results in inadequate provision of public goods and services, social capital can be particularly crucial and can substitute where the state fails. Tree planting, as a type of collective action, may offer an opportunity for the strengthening of bonding social capital as well as the creation of bridging social capital, which could help endow a marginalized and underserved community with the capacity needed to improve the neighborhood through crime protection efforts or mitigate local urban heat island impacts and improve environmental quality through creation of pocket parks. Given that urban tree canopy cover is already inequitably distributed in urban areas, with less

canopy cover over low-income neighborhoods (Heynen et al. 2006; Wilson & Lindsey 2009), tree-planting activities in marginalized areas therefore have the dual benefits of increasing canopy cover while potentially building social capital and adaptive capacity. Our research will enable analysis of this potential of urban tree-planting programs across multiple cities in the USA.

In addition to the collective action potential of participation in tree-planting project, urban trees can have a direct impact on how neighborhoods experience climate change, through mitigation of the urban heat island effect via shading and evapotranspiration (EPA 2008). Trees can also help manage water quality and stormwater runoff (Nowak 2006) resulting from unpredictable, more severe precipitation events associated with climate change (Allen and Soden 2008). Many urban areas have already undergone changes in climate similar to that projected for the world at large in the 21st century, with increases of nearly 5° C in minimum average daily temperatures in some cities (Akbari et al. 2001). Planting trees to shade streets and buildings can reduce air temperatures by up to 2° C (Kurn et al. 1994), increasing the capacity of urban residents to withstand extreme heat events, which are predicted to increase in frequency and magnitude in cities as climate change occurs (Stone et al. 2010).

On a larger scale, the plant hardiness zones created for trees by the Arbor Day Foundation have migrated northward, altering the planting recommendations for many US cities (http://www.arborday.org/media/mapchanges.cfm). These trends are likely to continue as anthropogenic climate change unfolds over time. The urban heat island places cities well ahead of the climate change curve for their surrounding areas in terms of average temperatures (Stone et al. 2010). This may provide an opportunity for the urban forest to serve as a seed bank and source of colonizing trees for the surrounding area, in effect speeding tree migration; indeed this may already be occuring (Woodall et al. 2010). Thus, the establishment and analysis of a dataset spanning multiple cities and years for the success of newly planted trees has the potential to help researchers and practitioners alike to understand the impact of climate change not just on urban forests, but potentially rural forests as well.

Our Research

The research proposed here attempts to build on the aforementioned studies through the lens of social-ecological systems research, which examines the interactions and outcomes of human society, our institutions (rules, norms and strategies that guide human behavior [Ostrom 2005]), and the biophysical world (Ostrom 2009a). Urban forests are social-ecological systems composed of biophysical components (trees and associated vegetation) and social components (individuals, households, neighborhoods, and governments, and their subsequent institutions, i.e., property rights and jurisdictions). Thus, like other social-ecological systems, urban forests are complex and adaptive, involving multiple subsystems (i.e., parks, street trees) as well as being embedded in larger systems (i.e., the regional landscape). To understand success and sustainability in these systems requires interdisciplinary and integrated modes of inquiry (Holling 1998) and long-term and cross-site analysis that builds on well documented and theoretically sound scholarship (Ostrom 2009a). In other words, we cannot understand what sustains a planted tree and its climate-maintenance functions by simply asking about the nutrients in the soil alone, or by independently inquiring about the social capital of the nearby residents, or by solely questioning the enforcement of tree watering rules. All of these questions must be explored synergistically in analysis of urban tree-planting programs as a social-

ecological system; in doing so, we are able to not only address the factors affecting the outcomes of tree planting but to consider the indirect impacts of tree planting on a community and its collective, civic ecology activities.

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Part B: Budget & Funding

Budget Justification

The project described involves an immense number of partners and proposes collection of a large amount of valuable data. Without funding requested here, such a nationally important project would not be possible. The bulk of the funds requested for this project will be used to hire personnel. These personnel will perform the following tasks during the specified time frames:

- A Ph.D. student to manage the entire project for at least 12 months (although we recognize that some of these activities will occur before and after the main 12 months of the project), including communicating with partners, finalizing all data collection protocols and techniques, organizing all opening workshop activities, training and managing graduate research assistants, performing data analysis, and organizing the writing of final reports to partners, journal articles and conference presentations.
- A Ph.D. student to develop social survey instruments during the fall of 2012;
- Eight graduate research assistants to supervise tree protocol data collection and conduct semi-structured interviews in each partner city from mid-May to August 2013;
- Additional Ph.D. student assistance with data analysis during the fall of 2013; and,
- Tree teams of 3–4 individuals hired by our nonprofit partners to collect tree protocol data during the summer of 2013 (partial funds requested; individual nonprofits will fund the bulk of the tree team as matching funds).

All results of this proposal will be available free of cost upon request, thus, there will be no income generated from this proposal.

Narrative Budget Table

	Requested	Match	Total	Source of match #
PERSONNEL				
PhD student (project manager) stipend [a]	$13,000		$13,000	
Health insurance costs	$2,776		$2,776	
PhD student (survey developer) stipend [b]	$4,500		$4,500	
Tuition remission (12 cr.)	$13,840		$13,840	
Health insurance costs	$1,057		$1,057	
PhD research assistant (RA) [c]	$2,808		$2,808	
Graduate Research Assistants (GRAs) [d]	$49,920		$49,920	
Fringes for GRAs and PhD RA [e]	$3,717		$3,717	
Burnell Fischer (2 months salary)		$21,368	$21,368	Indiana University
Fringes for Burnell Fischer		$8,975	$8,975	Indiana University
CONTRACT WORK				
Tree team [f]	$24,000	$96,000	$120,000	Partner organizations *
Administrative time [g]			$16,000	Partner organizations *
OPENING WORKSHOP				

	Requested	Match	Total	Source of match [#]
Travel, accommodations and meals [h]		$15,000	$15,000	Alliance for Community Trees
SUPPLIES				
Tree team equipment [k]		$24,000	$24,000	Partner organizations *
Survey distribution costs [m]	$10,000		$10,000	
DIRECT COSTS TOTAL				
Total direct costs [n]	$125,618	$30,343	$151,000	
Modified Total Direct cost (less tuition fee remission)	$111,778	$30,343		
INDIRECT COSTS				
Indiana University overhead [o]	$62,596	$16,992	$79,588	
TOTAL	**$188,214**	**$198,334**	**$386,549**	

[#] For more information on matching, please see Cost Share Information below.

* Partner organizations (8 tree-planting nonprofit organizations: Keep Indianapolis Beautiful, Inc. (Indianapolis, IN); Pennsylvania Horticultural Society (Philadelphia, PA); Friends of Trees (Portland, OR); Trees Atlanta (Atlanta, GA); Trees Forever (IA & IL); and three as of yet to-be-determined partners with whom we are in discussion) will each provide an equal amount of matching funds as indicated in description of budget items.

[a] 12 month appointment from May 2013–April 2014 to be subsidized by CIPEC; inclusion of health insurance costs mandatory per Indiana University.

[b] 1 semester (4 months) appointment from Sept–Dec 2012 to be subsidized by CIPEC; inclusion of tuition remission necessary for pre-examination PhD students; inclusion of 1 semester of health insurance costs mandatory per Indiana University.

[c] Approximately 13 hours per week for 18 weeks (1 semester) for 234 hours total, at a wage rage of $12/hr.

[d] One GRA per partner organization (8 total) to manage the tree team and conduct semi-structured interviews, for 40 hours per week for 13 weeks (4,160 work hours) during summer 2013, paid hourly at $12/hour

[e] Fringe rate is 7.05% for both GRAs and PhD RA; inclusion of fringes for hourly employees mandatory per Indiana University.

[f] One team of 3–4 individuals per partner (8 teams total) at an estimated cost of ~$15,000 each (per our experience with Keep Indianapolis Beautiful, Inc.'s Youth Tree Teams, which includes 3–4 individuals working 25–30 hours per week, and vehicle use costs); $12,000 per team provided as an in-kind match from each partner organizations, $3,000 subsidized by requested grant funds.

[g] Approximately 80 hours (2 weeks) of staff time over the course of the project from each of 8 organizations will be provided as an in-kind match; estimated at a salary rate of $1,000/week.

[h] Estimated cost for travel to Keep Indianapolis Beautiful, Inc. (Indianapolis, IN), local hotel accommodations, and meals for 25–30 participants in a two-day workshop; workshop costs to be covered by Alliance for Community Trees.

[k] Two sets of equipment at approximately $1500 each will be purchased for each of the eight tree teams (16 sets of equipment in all) by their respective partner organization; equipment will be standardized and determined in cooperation with partner organizations, taking into account existing equipment inventories.

[m] 200 surveys distributed according to the Dillman method (Dillman 2000) per each of 8 cities; cost estimate includes copying and mailing cost for initial mailing, second mailing and post card reminder.

[n] Total direct costs include all of the above costs; direct costs used for calculating the indirect costs (see note immediately below) exclude tuition fee remission per Indiana University).

[o] Indiana University indirect cost rate for research activities is 56% for 2012 (see Indirect Cost Rate Statement below); Indiana University also provides overhead in an amount of 56% of the IU-provisioned matching funds.

Cost-Share Information

Matching costs will be broken up between in-kind match and hard matching funds according to Table B2 below.

	Partner		
Expense (hard match, or in-kind)	**Indiana University**	**Alliance for Community Trees (ACTrees)**	**Each tree-planting organization (nonprofits)** [a]
Burnell Fischer supervisory capacity (2 months salary and fringes, in-kind match)	$30,343		
Tree team (in-kind match)			$12,000
Administrative time (estimated 2 weeks salary, in-kind match)			$2000
Travel, accommodations and meals for opening workshop (hard match)		$15,000	
Tree team equipment			$3,000
Indiana University overhead (indirect costs match)	$16,992		
TOTAL MATCH PER PARTNER	$47,335	$15,000	$17,000
TOTAL MATCHING FUNDS = IU match + ACTrees match + 8*nonprofit match			**$198,334**

[a] The amounts listed in this column represent the amount of match committed to by each individual tree-planting partner organization. For total amount of match provided by all partners, see Budget Narrative Table above.

COLLEGES AND UNIVERSITIES RATE AGREEMENT

EIN: 1356001673A1

ORGANIZATION:
Indiana University
Bryan Hall 212
Bloomington, IN 47405-1201

DATE: 06/20/2011

FILING REF.: The preceding agreement was dated 06/04/2008

The rates approved in this agreement are for use on grants, contracts and other agreements with the Federal Government, subject to the conditions in Section III.

SECTION I: INDIRECT COST RATES

RATE TYPES: FIXED FINAL PROV. (PROVISIONAL) PRED. (PREDETERMINED)

	EFFECTIVE PERIOD				
TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
PRED.	07/01/2008	06/30/2011	54.00	On Campus	Organized Research
PRED.	07/01/2008	06/30/2011	47.50	On Campus	Instruction
PRED.	07/01/2008	06/30/2011	26.00	I. U. Hospital	GCRC
PRED.	07/01/2008	06/30/2011	32.00	On Campus	Other Sponsored Activities
PRED.	07/01/2008	06/30/2011	26.00	Off Campus	All Programs
PRED.	07/01/2011	06/30/2012	55.00	On Campus	Organized Research
PRED.	07/01/2012	06/30/2015	56.00	On Campus	Organized Research
PRED.	07/01/2011	06/30/2015	47.50	On Campus	Instruction
PRED.	07/01/2011	06/30/2015	32.00	On Campus	Other Sponsored Activities
PRED.	07/01/2011	06/30/2015	26.00	Off Campus	All Programs

TYPE	FROM	TO	RATE(%)	LOCATION	APPLICABLE TO
PROV.	07/01/2015	Until Amended		Use same rates and conditions as those cited for FYE 06/30/2015.	

*BASE

Modified total direct costs, consisting of all salaries and wages, fringe benefits, materials, supplies, services, travel and subgrants and subcontracts up to the first $25,000 of each subgrant or subcontract (regardless of the period covered by the subgrant or subcontract). Modified total direct costs shall exclude equipment, capital expenditures, charges for patient care, student tuition remission, rental costs of off-site facilities, scholarships, and fellowships as well as the portion of each subgrant and subcontract in excess of $25,000.

ORGANIZATION: Indiana University

AGREEMENT DATE: 06/20/2011

SECTION II: SPECIAL REMARKS

TREATMENT OF FRINGE BENEFITS:

The fringe benefits are specifically identified to each employee and are charged individually as direct costs. The directly claimed fringe benefits are listed below.

TREATMENT OF PAID ABSENCES

Vacation, holiday, sick leave pay and other paid absences are included in salaries and wages and are claimed on grants, contracts and other agreements as part of the normal cost for salaries and wages. Separate claims are not made for the cost of these paid absences.

OFF-CAMPUS DEFINITION: For all activities performed in facilities not owned by the institution and to which rent is directly allocated to the project(s), the off-campus rate will apply. Actual costs will be apportioned between on-campus and off-campus components. Each portion will bear the appropriate rate.

Equipment Definition -
Equipment means an article of nonexpendable, tangible personal property having a useful life of more than one year and an acquisition cost of $5,000 or more per unit.

FRINGE BENEFITS:

FICA	Retirement
Life Insurance	Tuition Remission
TIAA/CREF	Worker's Compensation
Health Insurance	Unemployment Insurance
Long Term Disability	Fringe Benefit Administration
Employee Fee Courtesy (Faculty & Staff Fee Discount)	

ORGANIZATION: Indiana University

AGREEMENT DATE: 06/20/2011

SECTION III: GENERAL

A. LIMITATIONS:

The rates in this Agreement are subject to any statutory or administrative limitations and apply to a given grant, contract or other agreement only to the extent that funds are available. Acceptance of the rates is subject to the following conditions: (1) Only costs incurred by the organization were included in its facilities and administrative cost pools as finally accepted: such costs are legal obligations of the organization and are allowable under the governing cost principles; (2) The same costs that have been treated as facilities and administrative costs are not claimed as direct costs; (3) Similar types of costs have been accorded consistent accounting treatment; and (4) The information provided by the organization which was used to establish the rates is not later found to be materially incomplete or inaccurate by the Federal Government. In such situations the rate(s) would be subject to renegotiation at the discretion of the Federal Government.

B. ACCOUNTING CHANGES:

This Agreement is based on the accounting system purported by the organization to be in effect during the Agreement period. Changes to the method of accounting for costs which affect the amount of reimbursement resulting from the use of this Agreement require prior approval of the authorized representative of the cognizant agency. Such changes include, but are not limited to, changes in the charging of a particular type of cost from facilities and administrative to direct. Failure to obtain approval may result in cost disallowances.

C. FIXED RATES:

If a fixed rate is in this Agreement, it is based on an estimate of the costs for the period covered by the rate. When the actual costs for this period are determined, an adjustment will be made to a rate of a future year(s) to compensate for the difference between the costs used to establish the fixed rate and actual costs.

D. USE BY OTHER FEDERAL AGENCIES:

The rates in this Agreement were approved in accordance with the authority in Office of Management and Budget Circular A-21 Circular, and should be applied to grants, contracts and other agreements covered by this Circular, subject to any limitations in A above. The organization may provide copies of the Agreement to other Federal Agencies to give them early notification of the Agreement.

E. OTHER:

If any Federal contract, grant or other agreement is reimbursing facilities and administrative costs by a means other than the approved rate(s) in this Agreement, the organization should (1) credit such costs to the affected programs, and (2) apply the approved rate(s) to the appropriate base to identify the proper amount of facilities and administrative costs allocable to these programs.

BY THE INSTITUTION:

Indiana University

(INSTITUTION)

(SIGNATURE)

Neil Theobald

(NAME)

Vice President & CFO

(TITLE)

6/24/11

(DATE)

ON BEHALF OF THE FEDERAL GOVERNMENT:

DEPARTMENT OF HEALTH AND HUMAN SERVICES

(AGENCY)

(SIGNATURE)

Arif Karim

(NAME)

Director, Central States Field Office

(TITLE)

6/20/2011

(DATE) 5044

HHS REPRESENTATIVE: Denise Shirlee

Telephone: (214) 767-3261

Part C: Personnel & Organizational Capacity

Urban Forestry/Urban Ecology Research at CIPEC, Indiana University, Bloomington

The investigators of this proposal (see Table C1 for a list of investigator credentials and current positions) are situated within the Center for the Study of Institutions, Population, and Environmental Change (CIPEC) and the School of Public and Environmental Affairs (SPEA) at Indiana University (http://www.indiana.edu/~cipec/research/urban.php). In this unique, interdisciplinary setting, our research in urban forestry is informed by the numerous fields of our colleagues at CIPEC and SPEA (anthropology, biology, economics, environmental science, geography, political science, psychology, and public affairs). Fischer has been contracted (in 2007 and for 2012) by the City of Bloomington to conduct a full street tree inventory (see Fischer et al. 2007). Additional contract work includes a current contract to Fischer, Vogt and colleague Richard Hauer to conduct a literature review of the "Costs of Not Maintaining Trees" for the International Society of Arboriculture. Currently, Fischer, Mincey, Patterson and other CIPEC colleagues are investigating the role of household- and neighborhood-level decision making in residential vegetation management.

Table C1. Investigator credentials. All investigators are at Indiana University, Bloomington.

Investigator name	Credentials
Burnell C. Fischer (principal investigator)	Ph.D., Certified Forester; Clinical Professor, School of Public and Environmental Affairs (SPEA); Affiliated Faculty, Center for the Study of Institutions, Population, and Environmental Change (CIPEC); Affiliated Faculty, Workshop in Political Theory and Policy Analysis
Jessica M. Vogt	Ph.D. student, Environmental Science; MPA/MSES* student; SPEA/CIPEC
Sarah K. Mincey	MPA/MSES*; Ph.D. Candidate Environmental Science; SPEA/CIPEC
Matt Patterson	MPA/MSES* student, SPEA; Graduate Research Assistant, CIPEC
Shannon L. Watkins	Ph.D. student, Public Affairs, SPEA

*Master's of Public Affairs/Master's of Science in Environmental Science

All investigators are presently working with Keep Indianapolis Beautiful, Inc. (KIB) to evaluate their NeighborWoods tree-planting program, and through this work have piloted the young tree re-inventory protocol (Vogt et al. 2011). Through funding in the form of a $35,000 grant to KIB from the Efroymson Family Fund, during the summer of 2011, we re-inventoried approximately 270 trees planted in 2006 via ten KIB NeighborWoods planting projects. We found that across all projects, KIB NeighborWoods trees have a 93% survival rate; however, survival rates vary substantially between projects, ranging from 64% to 100% survival of trees planted in 2006. Our observations in the neighborhoods in which projects occurred indicated that houses and yards in the project with the lowest survival rate (where 36% of trees were dead, absent or for which only a stump remained) appeared less well maintained than other projects. Although we did not construct models of tree growth with this pilot data due to our small sample size, average growth rate (as measured by change in caliper since time of planting) was 9.9 cm between 2006 and 2011, or approximately 2 cm per year. (Vogt et al. 2011) Our experiences

with this pilot research inform the methodology – variable and instrument choice, and data collection process – described above.

Resources at CIPEC

CIPEC is a research institute at IUB, affiliated with the Anthropological Center for Training and Research on Global Environmental Change (ACT) and the Workshop on Political Theory and Policy Analysis (the Workshop). As a center for research, CIPEC has administrative and technical support staff to back development of the written and technical products specified in Deliverables above. Specifically, CIPEC has experience housing large, relational databases such as the community-planted trees database proposed in this project; CIPEC support staff manage the International Forestry Resources and Institutions (IFRI) database originating from the IFRI research program at IU's Workshop and the University of Michigan (http://sitemaker.umich.edu/ifri/resources). This support will be crucial to the management of the large project proposed here.

Specific Experiences and Expertise of Investigators

Burnell C. Fischer is currently a Clinical Professor at SPEA. In this capacity, he serves as the major professor for two of the co-investigators for this proposal (Mincey and Vogt), both studying urban forestry/urban ecology. He has been a Principal Investigator for several successful grants, including those from ISA, Indiana DNR Community & Urban Forestry Program, IUB Center for Research in Environmental Science, and the IU Office of Sustainability. Additionally, he has experience working with urban forestry nonprofit organizations, including as president (2010–2012) of the Indiana Urban Forestry Council, a board member of Keep Indianapolis Beautiful, Inc. and ACTrees, and a former board member of the Tree Boards for the Cities of Lafayette and Bloomington, IN. These current experiences and 15 year tenure as State Forester for Indiana have lent Fischer the administrative, research, and professional capacity to make him an ideal principal investigator on the large-scale, multi-city assessment of urban tree planting programs proposed here.

Jessica M. Vogt is a first year PhD student in Environmental Science, focusing on urban forestry and urban ecology. Her dissertation research will attempt to answer the broad research question: "How do urban policy, planning, and management decisions impact biophysical and ecological outcomes with respect to urban vegetation?" As a master's student at SPEA, Vogt worked with Fischer to conduct a survey of the urban forestry and community sustainability programs of Indiana Tree City USA municipalities; results of this research are currently being developed into a paper for submission to *Arboriculture & Urban Forestry.* From 2010 to 2011, Vogt worked for the City of Bloomington, IN, Environmental Commission as an intern researching and writing reports to support the Commission's work on greenhouse gas reductions, native landscaping, and environmental quality indicators reporting. Finally, Vogt's work leading the research design and implementation for the pilot project with Keep Indianapolis Beautiful, Inc., and demonstrated organizational skills and research experience make her a good candidate to head up the day-to-day management of the project proposed here.

Sarah Mincey is a PhD candidate and Associate Instructor in Environmental Science at SPEA. In 2007, she received dual master's degrees in Public Affairs and Environmental Science in Environmental Policy and Natural Resource Management, also from SPEA. Since 2009, Mincey has been a member of Indiana University's Tree Board. In 2010, she received the Garden Club of America Fellowship in Urban Forestry. Her dissertation research focuses on linking urban forest management across scales, from households to neighborhoods to municipal management, with the lessons learned from rural community forestry. Specifically, her dissertation research asks: "Across scales, how do institutions and collective action facilitate sustainable urban forest management within cities?" She presented her research regarding urban forests as common pool resources at the International Society of Arboriculture's 2009 conference. Mincey's research, which straddles the divide between the social and natural sciences, makes her uniquely suited to a project that considers the indirect, social effects as well as the direct effects of urban tree planting programs.

Shannon Lea Watkins is in her second year of the SPEA PhD program in Public Affairs, focusing in environmental policy and policy analysis. She has worked on several projects related to that proposed here, including a study of NGO involvement in the provision of energy services in the developing world, and is currently developing a project that tests whether current land use planning decisions at the local level exacerbate the existing inequitable distribution of parks and street trees in metropolitan areas. Watkins has completed coursework in econometric techniques, research design and program evaluation and, at the time of project implementation, will have further training in qualitative and mixed methods, geographic information systems, and survey design. These qualifications as a budding social scientist make Watkins a good candidate for developing social survey instrumentation for use in the proposed research.

Matt Patterson is a third year MPA/MSES student at SPEA. He has participated in several urban forestry research projects—all involving social elements—through his work as a graduate research assistant at CIPEC. He brings a broad set of skills to the project, including survey design, statistical and geospatial analysis, as well as substantial field experience in collecting ecological data. He is currently exploring options for pursing a PhD.

Part D: Letters of Partnership from Partners

See subsequent pages.

keep Indianapolis beautiful INC.

TO: National Urban and Community Forestry Advisory Council (NUCFAC)
ATTN: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1-Central)
201 14th Street S.W., MS-1151
Washington, D.C. 20250-1151

18 November 2011

To Whom It May Concern:

Our organization – Keep Indianapolis Beautiful, Inc.– has received and reviewed the grant proposal entitled, "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change" from Principal Investigator Burnell C. Fischer (at Indiana University, Bloomington). We agree with the concept and research proposed therein, and commit to be a Partner to this research. Please consider this letter to be the official Letter of Partnership from Keep Indianapolis Beautiful, Inc.

As a formal Partner to this research, we commit to the following if awarded the grant:

(1) One of our employees will attend a two-day project opening workshop at Keep Indianapolis Beautiful, Inc. in Indianapolis, IN. Food costs will be provided by grant funds.
(2) Provide an administrative match in the form of approximately eighty hours of staff time (in-kind match equal to approximately $2,000 of staff salary) over the course of the project. This includes staff time spent attending the opening workshop in Indianapolis, and communicating regularly with the project leader at Indiana University on project status, any difficulties arising, questions, concerns, etc., during the course of the project.
(3) Recruit, hire and pay a tree inventory team of 3-4 local individuals to collect data for the research project from mid-May to late-August of 2013 (12 weeks). The estimated cost of maintaining this team is set at $15,000. Our organization commits to cover approximately $12,000 of this cost, and the remaining $3,000 will be supplemented by funds requested in the proposal.
(4) Purchase approximately $3,000 of standard equipment for data collection. Equipment will be selected in consultation with the IU research team, but will also consider our own existing equipment inventory.
(5) Allow a Graduate Research Assistant hired by project managers at Indiana University to train and supervise the tree inventory team.

In summary, our organization agrees to provide $15,000 of matching funds for equipment and pay for the tree team and $2,000 of in-kind match in the form of administrative time.

We look forward to the opportunity to engage in a national research project, and hope you look favorably upon our proposal.

Thank you.

Sincerely,

David Forsell
President
Keep Indianapolis Beautiful, Inc.

PHS
PLANTING SEEDS. GROWING LIVES.

100 North 20th Street - 5th floor
Philadelphia, PA 19103-1495

215-988-8800
Fax: 215-988-8810
PHSonline.org

TO: National Urban and Community Forestry Advisory Council (NUCFAC)
ATTN: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1-Central)
201 14th Street S.W., MS-1151
Washington, D.C. 20250-1151

18 November 2011

To Whom It May Concern:

Our organization – the Pennsylvania Horticultural Society (PHS) – has received and reviewed the grant proposal entitled, "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change" from Principal Investigator Burnell C. Fischer (at Indiana University, Bloomington). We agree with the concept and research proposed therein, and commit to be a Partner to this research. Please consider this letter to be the official Letter of Partnership from PHS.

As a formal Partner to this research, we commit to the following if awarded the grant:

(1) Send one of our employees as a representative of PHS to a two-day project opening workshop at Keep Indianapolis Beautiful, Inc. in Indianapolis, IN, the travel, accommodation, and food costs of which will be provided by grant funds.
(2) Provide an administrative match in the form of approximately eighty hours of staff time (in-kind match equal to approximately $2,000 of staff salary) over the course of the project. This includes staff time spent attending the opening workshop in Indianapolis, and communicating regularly with the project leader at Indiana University on project status, any difficulties arising, questions, concerns, etc., during the course of the project.
(3) Recruit, hire and pay a tree inventory team of 3-4 local individuals to collect data for the research project from mid-May to late-August of 2013 (12 weeks). The estimated cost of maintaining this team is set at $15,000. Our organization commits to cover approximately $12,000 of this cost, and the remaining $3,000 will be supplemented by funds requested in the proposal.
(4) Purchase approximately $3,000 of standard equipment for data collection. Equipment will be selected in consultation with the IU research team, but will also consider our own existing equipment inventory.
(5) Allow a Graduate Research Assistant hired by project managers at Indiana University to train and supervise the tree inventory team.

In summary, our organization agrees to provide $15,000 of matching funds for equipment and pay for the tree team and $2,000 of in-kind match in the form of administrative time.

We look forward to the opportunity to engage in a national research project, and hope you look favorably upon our proposal. PHS has a nearly 200-year history of promoting greening in our region, and we are committed to helping discover and promote the economic and social value of tree planting at both local and national levels.

Thank you.

Sincerely,

Maitreyi Roy
Senior Vice President, Programs and Planning

TREES ATLANTA

225 CHESTER AVENUE
ATLANTA, GA 30316
PHONE: (404) 522-4097
FAX: (404) 681-3927
WWW.TREESATLANTA.ORG

TO: National Urban and Community Forestry Adv
ATTN: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1-Central)
201 14th Street S.W., MS-1151
Washington, D.C. 20250-1151

18 November 2011

To Whom It May Concern:

Trees Atlanta has received and reviewed the grant proposal entitled, "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change" from Principal Investigator Burnell C. Fischer (at Indiana University, Bloomington). We agree with the concept and research proposed therein, and commit to be a Partner to this research. Please consider this letter to be the official Letter of Partnership from Trees Atlanta.

As a formal Partner to this research, we commit to the following if awarded the grant:

(1) Send one of our employees as a representative of Trees Atlanta to a two-day project opening workshop at Keep Indianapolis Beautiful, Inc. in Indianapolis, IN, the travel, accommodation, and food costs of which will be provided by grant funds.
(2) Provide an administrative match in the form of approximately eighty hours of staff time (in-kind match equal to approximately $2,000 of staff salary) over the course of the project. This includes staff time spent attending the opening workshop in Indianapolis, and communicating regularly with the project leader at Indiana University on project status, any difficulties arising, questions, concerns, etc., during the course of the project.
(3) Hire and pay a tree inventory team or recruit volunteers of 3-4 local individuals to collect data for the research project from mid-May to late-August of 2013 (12 weeks). The estimated cost of maintaining this team is set at $15,000. Our organization commits to cover approximately $12,000 of this cost, and the remaining $3,000 to be supplemented by funds requested in the proposal.
(4) Purchase necessary equipment up to $3,000 for data collection. Equipment will be selected in consultation with the IU research team, but will also consider our own existing equipment inventory.
(5) Allow a Graduate Research Assistant hired by project managers at Indiana University to train and supervise the tree inventory team.

In summary, our organization agrees to provide $15,000 of matching funds, for equipment and pay for the tree team (or equivalent volunteer service) and $2,000 of in-kind match in the form of administrative time.

We look forward to the opportunity to engage in a national research project, and hope you look favorably upon our proposal.

Sincerely,

Greg Levine
Co-Executive Director and Chief Program Officer
Trees Atlanta

Alliance for Community Trees
4603 Calvert Road
College Park, MD 20740

T 301.277.0040
F 301.277.0042
E info@ACTrees.org
www.ACTrees.org

ACT
Tree by Tree
Street by Street

November 28, 2011

National Urban and Community Forestry Advisory Council (NUCFAC)

ATTN: Nancy Stremple, Executive Staff to NUCFAC

US Department of Agriculture - Forest Service

Sidney Yates Building (1-Central)

201 14th Street S.W. - MS-1151

Washington, D.C. 20250-1151

Dear Nancy:

Alliance for Community Trees, Inc. (ACTrees) has received and reviewed the grant proposal entitled "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change" from Principal Investigator Burnell C. Fischer, Indiana University, Bloomington, Indiana.

ACTrees agrees with the concept and research proposed therein, and commits to be a Partner to this research.

Please consider this letter to be the official Letter of Partnership from ACTrees.

As a Partner to this research, we commit to the following if this proposal is awarded the grant.

(1) ACTrees will provide matching funds in the amount of approximately $15,000 to support travel, accommodation, and food for Partner representatives traveling to Indianapolis, IN for the two-day project-opening workshop at the offices of Keep Indianapolis Beautiful, Inc. in Indianapolis.

(2) ACTrees will send one of our employees as a representative of ACTrees to this two-day project-opening workshop.

(3) ACTrees will communicate regularly with the Project Leader at Indiana

(3 continued) University on project status including any questions and/or difficulties arising throughout the course of the grant-funded project.

We look forward to the opportunity to engage in a national research project, and hope you look favorably upon our proposal.

Thank you.

Sincerely,

Carrie Gallagher
Executive Director

Copies:
Dr. Burnell Fischer, Indiana University
Ray Tretheway, Chair, ACTrees Board of Directors

Part E: Letters of Support from Stakeholders

See subsequent pages.

Center for the Study of Institutions, Population, and Environmental Change

Indiana University, 408 North Indiana Avenue, Bloomington, Indiana 47408 USA

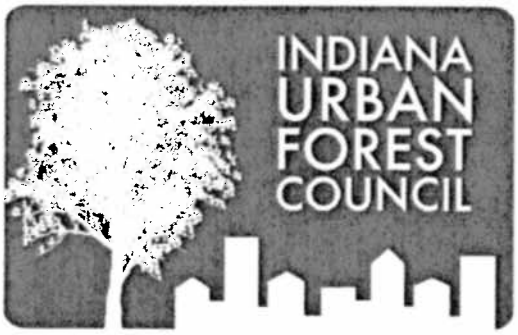
Tel: 812-855-2230 Fax: 812-855-2634 TDD: 812-855-7654

Web: www.indiana.edu/~cipec/ E-mail: cipec@indiana.edu

The Center for the Study of Institutions, Population, and Environmental Change (CIPEC) will support the proposed NUCFAC grant pre-proposal entitled, "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change," by providing facilities for data inventories and computer equipment and software for data analyses. In particular, we can support the project by providing technical skills and infrastructure including database design, database management, and spatial data analysis through applications of Geographic Information Systems (GIS). The science mission of CIPEC is to provide greater understanding of the complex interactions between people and the environment. We are dedicated to understanding these processes and sharing this knowledge with the scientific community and the public. Examining these processes in our urban forests and working with neighborhoods to accomplish this goal have the potential to provide significant advances in urban forest management. Thus the proposed project very clearly fits within our broader research agenda and we are excited about the potential outcomes from this research.

Tom P. Evans
Director

evans@indiana.edu
(812) 856-4587



TO: National Urban and Community Forestry Advisory Council (NUCFAC)
ATTN: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1-Central)
201 14th Street S.W., MS-1151
Washington, D.C. 20250-1151

18 November 2011

To Whom It May Concern:

Our organization – The Indiana Urban Forest Council– has received and reviewed the grant pre-proposal entitled, "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change" from Principal Investigator Burnell C. Fischer (at Indiana University, Bloomington). We agree with the concept and research proposed therein, and fully support this research. Please consider this letter to be the official Letter of Support from the Indiana Urban Forest Council.

The proposed project will potentially produce results valuable to our organization. In particular, we are interested in knowing what kinds of effects tree planting have on Indiana residents and the urban areas in which they reside. As the only statewide urban forestry nonprofit in Indiana, we actively advocate for trees in our cities and towns through letters to legislators and partnerships with other groups involved in tree care and planting in Indiana. Since this study seeks to find results from multiple cities, the evidence would hopefully support prior evidence indicating the significant benefits urban trees have on a variety of outcomes related to climate change.

We look forward to seeing the results of this national research project, and hope you look favorably upon their proposal.

Thank you.

Sincerely,

Ashley Mulis
Executive Director
Indiana Urban Forest Council

National Urban and Community Forestry Advisory Council (NUCFAC)
ATTN: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1-Central)
201 14th Street S.W., MS-1151
Washington, D.C. 20250-1151

Indiana DNR, Division of Forestry
Community & Urban Forestry
5785 Glenn Road
Indianapolis, IN 46216

To Whom It May Concern:

The Community & Urban Forestry program has received and reviewed the grant pre-proposal entitled, "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change" from Principal Investigator Burnell C. Fischer (at Indiana University, Bloomington). We agree with the concept and research proposed therein, and fully support this research. Please consider this letter to be the official Letter of Support from Indiana DNR, Division of Forestry, Community & Urban Forestry (CUF).

The proposed project will potentially produce results valuable to the CUF program. In particular, we are interested in knowing the survivor rates of the tree projects we have funded in the last few years. While we do have a three year maintenance requirement, it is not always possible to ascertain the health of the planted stock as it begins to adjust to the environment where it has been placed.

The CUF program has the tree species and location addresses of key tree planting projects throughout the state, and with adequate notice, we would be glad to provide that information for any research the project coordinators might like to do throughout Indiana.

This organization applicant has completed various grant projects with the CUF program in the past few years, and, I have found them done well, on time, within budget, and within the approved parameters. It is my hope that NUCFA will look favorably upon this request.

Cordially,

Pamela C. Louks
Community & Urban Forestry Coordinator
State of Indiana

Fischer-CIPEC-IU Pre-Proposal to USDA Forest Service "National Urban and Community Forestry Challenge Cost-Share Grant Program"

Program/Project Congressional Districts

Georgia 4–7, 13
Indiana 7
Iowa 1–5
Maryland 5
Michigan 13
Oregon 1–5
Pennsylvania 1–19

BUTLER UNIVERSITY

Department of Biological Sciences

4600 Sunset Avenue
Indianapolis, Indiana 46208-3485
(317) 940-9411

TO: National Urban and Community Forestry Advisory Council (NUCFAC)
ATTN: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1-Central)
201 14th Street S.W., MS-1151
Washington, D.C. 20250-1151

18 November 2011

To Whom It May Concern:

Our organization, Butler University's Center for Urban Ecology (CUE) has received and reviewed the grant pre-proposal entitled, "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change" from Principal Investigator Burnell C. Fischer (at Indiana University, Bloomington). We agree with the concept and research proposed therein, and fully support this research. Please consider this letter to be the official Letter of Support from CUE.

The proposed project will potentially produce results valuable to our organization. In particular, we are interested in how the research will provide insights into community improvements due to environmental activities. This is broadly applicable to the outreach and programmatic activities that we perform at the CUE as much of our engagement revolves around hands-on projects where the ecological benefits are relatively clear, but the benefits to the social fabric are less so.

We look forward to seeing the results of this national research project, and hope you look favorably upon their proposal.

Thank you.

Sincerely,

Tim Carter
Director
Center for Urban Ecology
Butler University

USDA United States Department of Agriculture | Forest Service | Northeastern Area State and Private Forestry | 1992 Folwell Avenue St. Paul, MN 55108

File Code: 1580
Date: November 22, 2011

National Urban and Community Forestry Advisory Council (NUCFAC)
Attn: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1 Central)
201 - 14th St. S.W., MS-1151
Washington, DC 20250-1151

To Whom It May Concern:

I have received and reviewed the grant pre-proposal entitled, "'Trees and People' – a two-way street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change" from Principal Investigator Burnell C. Fischer (at Indiana University, Bloomington). I agree with the concept and proposed research and fully support this project.

Many tree planting projects conducted by non-profit organizations are funded in part by the U.S. Forest Service. Knowing the factors that contribute to success of these types of plantings will help us provide guidance to partners when funding future projects and ultimately maximize the return on our investment. In addition, understanding the social impacts of local tree planting programs may provide another tool for helping communities in their climate change adaptation initiatives.

We look forward to seeing the results of this national research project and hope you look favorably upon their proposal. Thank you.

Sincerely,

Jill Johnson

JILL R. JOHNSON
Midwest Center for Urban & Community Forestry

Center for the Study of Institutions, Population, and Environmental Change
Indiana University, 408 North Indiana Avenue, Bloomington, Indiana 47408 USA
Tel: 812-855-2230 Fax: 812-855-2634 TDD: 812-855-7654 Web: www.cipec.org E-mail: cipec@indiana.edu

TO: National Urban and Community Forestry Advisory Council (NUCFAC)
ATTN: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1-Central)
201 14th Street S.W., MS-1151
Washington, D.C. 20250-1151

29 July 2012

Dear Ms. Stremple:

Please find attached to this letter a revised timeline for our National Urban and Community Forestry Advisory Council Challenge Cost-Share Grant, entitled, *"Trees and People" – A Two-Way Street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change.* This revised timeline stipulates that work will be completed for this grant by December 2014, approximately 28 months from the grant starting date in September 2012. This revision only affects the grant completion date and does not affect the funds requested in any way.

Our grant team has discussed our proposal award and we have decided that the postponement of data collection (which must occur between May and August, with trees leaf-on) reflected in the timeline attached is necessary for the following reasons:

- Since we received notification of the grant award only recently – via your email dated 27 July, 2012 – and later than we had initially anticipated, we have been unable to begin planning grant activities this summer.
- We believe that in order to do a fair job partnering with the nonprofit tree-planting organizations, additional time is desirable to allow these nonprofits to fundraise the required $15,000 in matching funds in advance of the start of the May through August data collection season. Data collection starting in May 2013 is simply not feasible given an award notification date of 27 July, 2012. A year of fundraising time would be more desirable.
- Time is also required to adequately involve the nonprofits in the survey development and data collection design process and ensure that the activities we implement are truly useful for each of the nonprofits and to ensure full buy-in and cooperation of our stakeholders. We believe this is preferable to rushed survey and data collection design processes that do not involve the stakeholder nonprofit and appear to be forced upon them.
- Additionally, our experiences this May through July working with Keep Indianapolis Beautiful, Inc., have led us to realize that in order for data collection operations to go smoothly, we will need to take substantial time to examine the existing tree planting records of each of our partner nonprofits. As each nonprofit keeps a unique type of database and there is no standardized method of record keeping, we will need to develop a slightly modified data collection plan for each of the six partner cities.
- In order to develop the networks with local universities that will be required to hire and maintain Graduate Research Assistants (GRAs) in each of the 6 cities, we need time to nurture existing connections between the nonprofits and local universities and perhaps develop new partnerships.

Careful selection of GRAs in advance of data collection is crucial to the collection of high quality data. We believe that there is not time to do this in the timeline initially proposed.

- In order to obtain the necessary approval for research with human subjects, we need to submit a finalized study plan and all study implements (interview questions, survey questions, protocol for selection of subjects, etc.) with Indiana University's Institutional Review Board (IRB) at least 6-8 weeks prior to first contact of human subjects, and allow for the potential of revisions that may take as much additional time.

These reasons lead us to conclude that if we are to meet the goal of our grant to develop a model process for tracking of trees and their effects on neighborhoods by tree-planting entities, we must take the necessary time to engage and involve our nonprofit partners in the process from start to finish.

We hope that this new timeline is satisfactory to NUCFAC. Please let us know if you have any questions. Thank you.

Sincerely,

Burnell C. Fischer

Burnell C. Fischer
Principal Investigator

1 Enclosure: Proposed Project Timeline

PROPOSED PROJECT TIMELINE

Timeframe	Activities
Sept-Dec 2012	Survey development Brief meeting with nonprofits in attendance at the Partners in Community Forestry Meeting in Sacramento, CA (November)
Jan-Apr 2013	Survey vetting with nonprofits (chance to add questions unique to each nonprofit) Vetting interview and tree inventory methods with nonprofits Begin developing connections with local universities in each city to find Graduate Research Assistants Begin working with Indiana University's Institutional Review Board (IRB) to begin review process for research with human subjects Interim progress report and draft data collection materials (survey, interview questions, tree inventory protocol) submitted to NUCFAC (April 30, 2013)
May-Aug 2013	Planning for project opening meeting Opening meeting with nonprofits in Indianapolis (June-July) Refining methods per vetting with nonprofits Examining tree records of each nonprofit and designing a unique sampling plan for each city Testing of survey questions with focus groups
Sept-Dec 2013	Obtain final IRB approval for finalized study plan Continue designing and finalize sampling plans working with nonprofits Database cleaning for use with ArcGIS iPhone app Writing contracts and expectations (job descriptions) for tree data collection teams and Graduate Research Assistants Obtain mailing lists of tree planting participants from each nonprofit Interim progress report and final data collection protocols submitted to NUCFAC (Dec 31, 2013)
Jan-Apr 2014	Hiring and training of summer GRAs Finalizing plan of work (weekly/daily schedules) for data collection in each city Contacting neighborhood contacts for interviews Mailing of surveys to tree planting participants
May-Aug 2014	Data collection: tree inventory, surveys returned and responses recorded, interviews conducted, transcribed and recorded. Interim progress report submitted to NUCFAC (July 31, 2013)
Sept-Dec 2014	Data analysis and report writing Finalizing multi-city community-planted trees database Disseminating data collection protocols Drafting city-specific reports Submit abstract for presentation of results at International Society of Arboriculture meeting Final report submitted to NUCFAC (Dec 31, 2014)

APPLICATION FOR FEDERAL ASSISTANCE SF-424 - MANDATORY

* Consolidate Application/Plan/Funding Request Explantion

APPLICATION FOR FEDERAL ASSISTANCE SF-424 - MANDATORY

*** Applicant Federal Debt Delinquent Explanation**

BUDGET INFORMATION - Non-Construction Programs

OMB Number: 4040-0006
Expiration Date: 06/30/2014

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. 2012 Urban and Community Forestry Challenge Cost Share Grant Program	10.675	$	$	$ 173,206.00	$	$ 173,206.00
2. Non-Federal portion 2012 Urban and Community Forestry Challenge Cost Share Grant Program					188,365.00	188,365.00
3.						
4.						
5. Totals		$	$	$ 173,206.00	$ 188,365.00	$ 361,571.00

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SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY (1)	(2)	(3)	(4)	Total (5)
	2012 Urban and Community Forestry Challenge Cost Share Grant Program	Non-Federal portion 2012 Urban and Community Forestry Challenge Cost Share Grant Program			
a. Personnel	$ 72,420.00	$ 26,620.00	$	$	$ 99,040.00
b. Fringe Benefits	7,327.00	11,537.00			18,864.00
c. Travel	2,000.00	15,000.00			17,000.00
d. Equipment	0.00	18,000.00			18,000.00
e. Supplies	10,000.00				10,000.00
f. Contractual	18,000.00	84,000.00			102,000.00
g. Construction					
h. Other	2,000.00	11,840.00			13,840.00
i. Total Direct Charges (sum of 6a-6h)	111,747.00	166,997.00			$ 278,744.00
j. Indirect Charges	61,459.00	21,368.00			$ 82,827.00
k. TOTALS (sum of 6i and 6j)	$ 173,206.00	$ 188,365.00	$	$	$ 361,571.00
7. Program Income	$	$	$	$	$

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SECTION C - NON-FEDERAL RESOURCES

(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
8. 2012 Urban and Community Forestry Challenge Cost Share Grant Program	$	$	$	$
9. Non-Federal portion 2012 Urban and Community Forestry Challenge Cost Share Grant Program	71,365.00		117,000.00	188,365.00
10.				
11.				
12. TOTAL (sum of lines 8-11)	$ 71,365.00	$	$ 117,000.00	$ 188,365.00

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	$ 136,292.00	$ 23,609.00	$ 15,518.00	$ 80,113.00	$ 17,052.00
14. Non-Federal	$ 188,365.00	29,722.00	32,881.00	107,881.00	17,881.00
15. TOTAL (sum of lines 13 and 14)	$ 324,657.00	$ 53,331.00	$ 48,399.00	$ 187,994.00	$ 34,933.00

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT

(a) Grant Program	FUTURE FUNDING PERIODS (YEARS) (b)First	(c) Second	(d) Third	(e) Fourth
16. 2012 Urban and Community Forestry Challenge Cost Share Grant Program	$ 36,914.00	$	$	$
17. Non-Federal portion 2012 Urban and Community Forestry Challenge Cost Share Grant Program				
18.				
19.				
20. TOTAL (sum of lines 16 - 19)	$ 36,914.00	$	$	$

SECTION F - OTHER BUDGET INFORMATION

21. Direct Charges: 111747

22. Indirect Charges: Predetermined, Base $109,747 Rate 56% IC $61,459

23. Remarks: Direct and Indirect charges in lines 21 and 22 are federal money only.

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	(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e)TOTALS
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OMB Number: 4040-0007
Expiration Date: 06/30/2014

ASSURANCES - NON-CONSTRUCTION PROGRAMS

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the awarding agency. Further, certain Federal awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project cost) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards for merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).

6. Will comply with all Federal statutes relating to nondiscrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C.§§1681-1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U. S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended, relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee- 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and, (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal or federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

8. Will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

9. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333), regarding labor standards for federally-assisted construction subagreements.

10. Will comply, if applicable, with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) Implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

12. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq.).

14. Will comply with P.L. 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (P.L. 89-544, as amended, 7 U.S.C. §§2131 et seq.) pertaining to the care, handling, and treatment of warm blooded animals held for research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

18. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	TITLE
Steven A. Martin	Associate VP for Research Admin.
APPLICANT ORGANIZATION	DATE SUBMITTED
Trustees of Indiana University	03/27/2012

Center for the Study of Institutions, Population, and Environmental Change
Indiana University, 408 North Indiana Avenue, Bloomington, Indiana 47408 USA
Tel: 812-855-2230 Fax: 812-855-2634 TDD: 812-855-7654 Web: www.cipec.org E-mail: cipec@indiana.edu

TO: National Urban and Community Forestry Advisory Council (NUCFAC)
ATTN: Nancy Stremple, Executive Staff to NUCFAC
USDA Forest Service
Sidney Yates Building (1-Central)
201 14th Street S.W., MS-1151
Washington, D.C. 20250-1151

16 March 2012

Dear Ms. Stremple:

Please find attached to this letter our Full Proposal for the National Urban and Community Forestry Advisory Council Challenge Cost-Share Grant Opportunity, entitled, *"Trees and People" – A Two-Way Street: A research program to assess the direct and indirect effects of urban tree planting programs in the face of climate change."*

There are three main components to this submission:

1. A memo summarizing our responses to the questions and comments from the review panel (immediately following this cover letter).
2. The Grants.gov interactive PDF (including federal forms embedded as attachments), modified to reflect recent proposal changes, and
3. The slightly modified proposal narrative and appendix (embedded within the Grants.gov PDF).

Main changes to this Full Proposal compared to the Pre-Proposal include:

- A reduction in the number of tree planting nonprofit partner organizations from 8 to 6 (with Alliance for Community Trees, this makes 7 total partner organizations);
- Minor changes to the methods proposed for social data collection that address potential bias and causality issues (pages 10-12 in Narrative); and,
- A reduction in the budget that corresponds with the reduction in the number of partner organizations and changes in the social data methods. We are now requesting $173,206 and providing $188,365 in matching funds, for a total project budget of $361,571.

Please let us know if there is any additional information you require. Thank you for selecting us to submit a Full Proposal. We hope you look favorably on our submission.

Sincerely,

Burnell C. Fischer
Principal Investigator

Steven A. Martin
Associate VP for Research Administration

ADDENDUM TO FULL PROPOSAL

Submitted by Burnell C. Fischer et al to the National Urban and Community Forestry Advisory Council Challenge Cost-Share Grant Program

NUCFAC Review Panel Comments & Responses

The comments and questions of the Review Panel and NUCFAC have been categorized into the following topics:

1. Climate change
2. Our partnerships
3. Social methods
4. Biophysical methods
5. Target audience
6. Budget

Questions and comments appear below in their near-entirety. We have provided answers (similar to those given in the phone conference interview of 28 February 2012) with full citation to the literature where appropriate.

1. ON CLIMATE CHANGE

Q: How is climate change an essential part of this proposal?

A: Successful, neighborhood-initiated tree plantings potentially have both direct and indirect connections to climate change. Healthy trees that grow to maturity provide more shade (Akbari et al 2001), sequester more carbon (Nowak & Crane 2002), and clean more air (Luley & Bond 2002), and therefore, over the course of the tree's lifetime, provide more climate change mitigation. Additionally, neighbors voluntarily engaging in community tree-planting activities are an example of neighborhood-level collective action. Previous research shows that collective action builds social capital, trust, and reciprocity among individuals (Adger 2003; Ostrom 1996). Social capital increases both the likelihood that a neighborhood takes additional collective action to prepare for climate change—their *adaptive capacity to climate change*—as well as the ability of the neighborhood to respond to extreme circumstances resulting from climate change—their *resilience in the face of climate change* (Adger 2003).

Mitigation benefits of trees related to climate change include:

- Planted trees shade buildings, reducing energy use and therefore climate-changing greenhouse gas emissions (Akbari et al 2001).
- Planted trees sequester carbon, reducing the concentration of climate-changing carbon in the atmosphere (Nowak & Crane 2002).
- Planted trees filter pollutants out of the air (Morani et al 2011); many pollutants are also greenhouse gases and are exacerbated by global warming (Jacobson 2010).

Recent climate change literature is using theories related to collective action to think about how we get communities to take action to mitigate or adapt to climate change.

- "Co-benefits" is the idea that particular project can have climate change mitigation or adaptation *as well as* other goals (Westphal & Hirsch 2010). Tree-planting projects may have co-benefits in the form of the climate-mitigating effects of trees in the ground, as well as increased neighborhood social capital and ability to take other actions. Other actions a neighborhood could take include community gardening, installing rain barrels, and car sharing projects, all of which have the potential for climate change adaptation.
- According to the theory of Asset Based Community Development, community activities that are rooted in the perceptions, values, and strengths of the community are more successful

than those that are based on outsider's ideas. Thus, tree-planting activities that neighborhoods are already involved in could provide an in-road to climate change adaptation activities. (Westphal & Hirsch 2010).

The data our project collects on neighborhood tree planting and other types of collective action could be used by the nonprofit organization and the city in promoting climate change activities in these neighborhoods. In our preliminary research with Keep Indianapolis Beautiful, we've heard anecdotally from neighborhoods that they have changed how they act as a result of tree planting. For instance, one neighborhood leader claims that their neighborhood will not plant trees in the spring in Indianapolis anymore, because past summers of drought have led to high mortality of spring-planted trees. Other research has indicated that tree-planting activities do change individuals' perceptions of trees and the environment (Summit & McPherson 1998; Summit & Sommer 1998)

Q: How are you relating Green House Gas initiatives to Climate Change?

A: We have not discussed greenhouse gas initiatives in our proposal at all. Although some nonprofit tree planting organizations may make tree planting a part of their own or their city's greenhouse reduction initiative—because trees sequester carbon—we are not explicitly evaluating the carbon sequestration benefits of trees in our project. What we are interested in are the climate mitigating and adapting effects that tree planting activities may have for neighborhoods and communities. Future researches interested in the effectiveness of tree planting at sequestering carbon may use the datasets produced by this project as a resource, however.

2. ON OUR PARTNERSHIPS

Q: The partners are the most successful organizations in Urban Forestry. Are these the best groups to do the research sets in? What about other projects and organizations?

A: We used Alliance for Community Trees to reach out to the nonprofit tree planting organizations with databases of the trees they've planted. We were looking for large, successful organizations with some history of urban tree planting so that we can judge their success.

Organizations we've talked to that were not ready to commit to such a large-scale research project as that which we have proposed include:

- Tree Trust (Minneapolis, MN)
- Greening Milwaukee (WI)
- Tree Pittsburgh (PA)
- Trees Nashville (TN)
- Casey Trees (Washington, D.C.)

Q: Would working with only the most successful groups like (i.e. PHS, Trees Forever, Trees Atlanta) provide somewhat biased results?

A: While variation across nonprofit programs is an important factor to consider, it is not the primary focus of our research questions. Rather, we are primarily interested in understanding neighborhood-scale variation *within* a city where all neighborhoods are served by a single non-profit. However, to compare neighborhoods *across* cities—a secondary goal of this research—the best research design controls for differences between nonprofits. By choosing the most successful non-profit groups across cities, we believe we have controlled for a great deal of potential variation that would be related to programming success and organizational capacity. In addition, the data requirements of this research restricts the pool of participants to those with pre-existing datasets—for both trees and program participants—something

that it appears only large and successful non-profits possess at this time. While this may introduce a potential bias, it is one we explicitly recognize, and will address to the best of our ability.

Q: Cities connected to the project have specific challenges that appear that they were not taken into consideration because the cities involved in the project receive little to no rain fall. So the applicant may need to take this into consideration if they are selected for a Full proposal.

A: The cities we have selected are primarily in wetter, temperate regions of the northwest and northeast United States (see Table 1 below for climate data for study cities), with average annual rainfall between 82 and 130 cm (32 to 51 in). Although some of these cities may have had drier years in the past decade, none of them have had the types of substantially limited amounts of rainfall typical of cities in the southwest. The fact that any city may have experienced below-average rainfall in one or more seasons since the trees being studied were planted can actually help us in our evaluation of tree planting programs in the face of a more unpredictable and variable climate.

Table 1. Average and recent climate information.

City (Nonprofit)	Average temperature (Farenheit)			Average annual precipitation [a]	Hardiness Zone [c]
	12-month [a]	Jan [b]	Jul [b]		
Des Moines, IA (Trees Forever)	48.7°	31°/14°	86°/67°	84 cm (33 in)	5a-5b
Atlanta, GA (Trees Atlanta)	60.3°	52°/34°	89°/71°	130 cm (51 in)	7b-8a
Indianapolis, IN (Keep Indianapolis Beautiful)	51.8°	34°/19°	84°/65°	101 cm (40 in)	6a
Philadelphia, IN (Pennsylvania Horticultural Society)	54.3°	40°/26°	87°/69°	112 cm (44 in)	7a-7b
St. Louis, MO (Forest ReLeaf of Missouri)	55.7°	40°/24°	89°/71°	96 cm (38 in)	6b
Detroit, MI (Greening of Detroit)	48.3°	31°/20°	83°/65°	82 cm (32 in)	6a-6b

[a] 12-month average temperature and precipitation data (1950-2000) from the WorldClim Global Climate database (http://www.worldclim.com/; Hijmans et al 2005).
[b] January and July average high/low temperatures and average monthly precipitation (from http://www.weather.com.
[c] Hardiness zone from the 2012 USDA Hardiness Zone Map (http://www.usna.usda.gov/Hardzone/).

3. ON SOCIAL METHODS

Q: The reviewers are not convinced that we can, with a high degree of accuracy, assess possible social outcomes.

A: Our research team is located in two Indiana University research centers – the Center for the Study of Institutions, Population and Environmental Change and the Workshop in Political Theory and Policy Analysis, the home of 2009 Nobel Prize laureate in Economics, Elinor Ostrom –where this type of social-ecological research is routinely conducted with high degree of accuracy. These centers have developed protocols that are used internationally to assess the social side of natural resource management, including the International Forestry Resources and Institutions protocol and database (Gibson et al 2000), now housed at the University of Michigan, Ann Arbor (http://sitemaker.umich.edu/ifri/home).

We believe the mixed methods research we've proposed – semi-structured ethnographic interviews, participatory action research, participant-observation in neighborhoods, structured surveys of individuals, U.S. Census data, geographic information systems (GIS) datasets, and more – will be able to assess social outcomes. These methods are commonly used by social scientists seeking to get a clear picture of the activities and beliefs of small groups of people (such as a neighborhood; e.g., Westphal & Hirsch 2010), and our research group has training and experience with these methods in the past (see http://www.indiana.edu/~cipec/research/urban.php).

We acknowledge the potential that these methods all involve self-reporting of activities and beliefs of the individuals involved in neighborhood-initiated tree planting projects and thus the social outcomes we report may be just perceived outcomes. However, corroborating stories and perceptions across individuals involved in a single planting project will help us achieve as accurate a recollection of events as possible.

Q: In relation to web-based surveys, please take in account those that did not respond.

A: We are not proposing to do web-based surveys, because some of the tree planting participants may not have internet access. We propose to do conventional, by-mail surveys.

We will use the Dillman Design Method, a well-known and widely used method for social surveying, which involves multiple mailings, follow-ups, and is designed to deal effectively with non-response bias (Dillman 2000). A 30% response rate can be expected with this method, and non-respondents are deemed to be not significantly different from respondents in terms of characteristics that may bias the survey's results.

4. ON BIOPHYSICAL METHODS

Q: What are the tree age and size thresholds? Small trees don't always mean they are young trees. Are you including volunteer trees or only planted trees? Volunteer trees are a big part of it.

A: We are re-measuring trees planted by nonprofit tree planting organizations. Tree age or size per se is not a factor for inclusion in the study.

Trees will be selected for re-measurement if:

- They were part of a planting project organized by a nonprofit tree-planting organization that is one of our study partners,
- The nonprofit has a record of their location and some minimal planting information (date, size, species),
- The trees were planted by volunteer tree-planting project participants (i.e., citizens, not professionals), and,
- The trees were planted within the last 10 years.

Q: Are these the best variables to collect to analyze the relationship?

A: We've developed a data protocol that can be used by high schoolers and non-expert citizens to collect data accurately and efficiently. The variables we've chosen to collect are based on our pilot study in Indianapolis, and align with the Urban Forestry Data Standards effort (USFS/ISA/IUFRO 2010). Given these multiple goals, and the existing disagreement in the literature over the most important variables affecting urban tree growth, these are the best variables to collect for our purposes.

5. ON THE TARGET AUDIENCE

Q: Is this the best target audience to make a difference and the intent of this proposal?

A: The target audience we have identified is the entire membership of ACTrees, who may be able to use our planted tree re-inventory protocol to collect data about the trees they plant. Additionally, our results will be disseminated through journal articles, fact sheets and professional papers, all of which will be accessible to nonprofits around the country and can be used to generate discussion of best practices for tracking the survival and growth of young trees in cities throughout the country. We believe that this is an entirely appropriate target audience for our proposal, and allows us to make the biggest potential difference in tree planting success across the country.

6. ON THE BUDGET

Q: There is a concern that a lot of money is going into academic wages.

A: $99,747 of the funds requested will go toward personnel costs ,while $133,997 is provided in matching personnel funds (this includes tree data collection team costs and required health insurance, fringes, and part of tuition remission for student employees).

Data collection and data entry are labor-intensive processes. To get reliable and accurate data, it is necessary to have highly trained, well-paid overseers of data collection. Thus, we insist on hiring paid, graduate student research assistants (GRAs) to manage data collection at each of the project partner cities, including conducting semi-structured interviews with tree planting participants and overseeing tree protocol data collection. These graduate students will ideally be students at a local university, but in the event that they are from out-of-town, we must compensate them at a rate that allows them to live in the city of study during summer data collection. Data collected, however, is not usable until it is properly entered. Thus, we require funds for approximately 600 total hours of interview transcription and household survey data entry. These estimate is made from our previous experience with household survey data entry—one survey takes approximately 10 minutes to enter into a computerized database; thus, 1200 surveys will take approximately 200 hours to enter); and with interview transcription—transcribing a simple interview between two people generally takes one and a half to two times as long the interview itself, so 30-40 hour-long interviews per each of six project sites will require between 270 and 480 hours to transcribe.

All academic wages are for graduate students, for whom working on this project will be their sole source of income during the period they work on the project. The PhD student project manager stipend listed in the budget is less than that typical for the university, and thus will be supplemented by funds provided by the Center for the Study of Institutions, Populations and Environmental Change (CIPEC) to bring this stipends up to the university standard of $8,500 per fall or spring semester and $3,500 per summer term ($20,500 per calendar year; 2012 figures). PhD students who are not yet finished with coursework are required by the university to be allotted tuition remission fees, which we have accounted for mostly with matching funds.

Table 2 below displays the hourly wage rates and total number of hours worked per week during the course of the project for all personnel for whose pay grant money is requested or whose time is being used as an in-kind match.

Table 2. Hourly wage rates (or equivalent) for positions in the proposed research project. (Excludes tree team data collection costs, which may have wage rates that vary slightly depending on the nonprofit and city.)

Position	Wage rate	Hours work per week	Number of weeks worked total	Total salary for project	Requested funds or in-kind match
Principal Investigator (Burnell C. Fischer)	$50/hour	6	86	$26,620	Match
Nonprofit administrative time (at each of six nonprofits)	$25/hour	80 total hours		$2,000	Match
Project Manager (PhD student)	$18/hour	15	50	$14,000	Requested

Position	Wage rate	Hours work per week	Number of weeks worked total	Total salary for project	Requested funds or in-kind match
Survey Developer (PhD student)	$18/hour	25	18	$8,500	Requested
PhD Research Assistant	$12/hour	15	18	$3,240	Requested
Graduate Research Assistants (six individuals)	$12/hour	40	13	$6,240	Requested
Data entry research assistant(s) Transcription	$10/hour	400 total hours		$4,000	Requested
Data entry research assistant (s) Survey data entry	$10/hour	200 total hours		$2,000	Requested

REFERENCES

(See also Appendix: Part A: Literature Review)

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Forest Service use only.

Control Number: _____

COVER SHEET

2012 U.S. Forest Service
National Urban and Community Forestry Challenge Cost-Share Grant Program

Proposals are due by 11:59 PM Eastern Standard Time, December 1, 2011

INNOVATION GRANT CATEGORY:
(Estimated total amount available is **$900,000,** approximately $300,000 per category)
(Select only one)

- [x] How Management of Urban and Community Forests Can Help Mitigate Greenhouse Gas Emissions or Help Communities Adapt to Climate Change
- [ ] The Influence of Urban and Community Forests upon Public Health
- [ ] Urban and Community Forestry as Economic Development

PROJECT CONTACT NAME, ORGANIZATION, ADDRESS, PHONE NUMBER, FAX NUMBER AND **EMAIL ADDRESS**:

Burnell C. Fischer, Clinical Professor
School of Public and Environmental Affairs
Indiana University, 1315 E 10th Street
Bloomington, IN 47405
Office: 812-856-5016; Fax: 812-855-7802; Email: bufische@indiana.edu

PROJECT TITLE:

"Trees and People" - A Two-Way Street

FUNDING REQUEST AND MATCH (Note: Matching amount must at a minimum equal requested amount.)

REQUESTED: $ 188,215 + MATCHING: $ 198,334 = TOTAL PROJECT: $ 386,549

Please Note: All Partner fields in the original, interactive PDF filled with the information entered for the first Partner. Upon changing the information for the second Partner, all fields, including the fields for the first Partner, changed to the information entered for the second Partner. Therefore, we created the Partner pages in a Word document, converted it to a PDF, and inserted it in this original, interactive PDF.

OUTREACH:

Note: if one checks "Yes" in either of the boxes below, the applicant will be required to describe either how they plant to outreach to the identified population and/or provide a description of your underserved organization.

Is this project being developed to reach a minority or underserved population? ☐ Yes ☑ No

Is this pre-proposal being submitted by a minority or underserved population (owned/operated/directed) business, organization or college/university? ☐ Yes ☑ No

PROJECT PARTNERS:

NAME: **Carrie Gallagher (Executive Director)**

LETTER OF SUPPORT INCLUDED: YES ☑ NO ☐

NAME OF ORGANIZATION: **Alliance for Community Trees (ACTrees)**

MAILING ADDRESS 1: **4603 Calvert Rd**

CITY: **College Park** STATE: **MD** ZIP CODE: **20740**

PHONE: **(301) 277-0035** EMAIL: carrie@actrees.org

##########

NAME: **David Forsell (President)**

LETTER OF SUPPORT INCLUDED: YES ☑ NO ☐

NAME OF ORGANIZATION: **Keep Indianapolis Beautiful, Inc. (KIB)**

MAILING ADDRESS 1: **1029 Fletcher Ave., Suite 100**

CITY: **Indianapolis** STATE: **IN** ZIP CODE: **46203**

PHONE: **(317) 264-755** EMAIL: dforcell@kibi.org

##########

NAME: **Maitreyi Roy (Executive Director)**

LETTER OF SUPPORT INCLUDED: YES ☑ NO ☐

NAME OF ORGANIZATION: **Pennsylvania Horticultural Society (PHS)**

MAILING ADDRESS 1: **100 N. 20th St. – 5th Floor**

CITY: **Philadelphia** STATE: **PA** ZIP CODE: **19103**

PHONE: **(215) 988-8800** EMAIL: mroy@pennhort.org

##########

PROJECT PARTNERS Continued:

NAME: **Shannon Ramsay (Founding President and CEO)**

LETTER OF SUPPORT INCLUDED: YES ☐ NO ☑

NAME OF ORGANIZATION: **Trees Forever**

MAILING ADDRESS 1: **770 7th Ave.**

CITY: **Marion** STATE: **IA** ZIP CODE: **52302**

PHONE: **(319) 373-0650** EMAIL: sramsay@treesforever.org

##########

NAME: **Scott Fogarty (Executive Director) - TENTATIVE**

LETTER OF SUPPORT INCLUDED: YES ☐ NO ☑

NAME OF ORGANIZATION: **Friends of Trees**

MAILING ADDRESS 1: **3117 NE Martin Luther King Jr. Blvd.**

CITY: **Portland** STATE: **OR** ZIP CODE: **97212**

PHONE: **(503) 467-2519** EMAIL: scottf@friendsoftrees.org

##########

NAME: **Greg Levine (Co-Executive Director and Chief Program Officer)**

LETTER OF SUPPORT INCLUDED: YES ☑ NO ☐

NAME OF ORGANIZATION: **Trees Atlanta**

MAILING ADDRESS 1: **225 Chester Ave**

CITY: **Atlanta** STATE: **GA** ZIP CODE: **30316**

PHONE: **(404) 681-4903** EMAIL: greg@treesatlanta.org

##########

ABSTRACT: Summarize the proposed project in 200 words or less.

We seek funds for an interdisciplinary, collaborative, multi-city research program to evaluate urban tree-planting programs' *direct effects* --survival/growth of urban trees --and *indirect effects* --engaging neighborhoods/individuals in tree-planting programs and other community projects aimed at adapting to climate change. We have partnered with Alliance for Community Trees and five tree-planting nonprofit organizations across the country to expand the research we are conducting with Keep Indianapolis Beautiful. We seek to collect data via two protocols: re-inventories of young trees for data on tree-specific and local environmental variables, and surveys and interviews about social, indirect effects for data on individual/community characteristics and management practices. We will conduct these protocols in each organization's city to assess the outcomes of their programs.
Results of this research will (1) help close the gap between the organizations' desired knowledge and existing practice; (2) generate data for a national-scale assessment of community tree-planting programs in the face of climate change; and (3) inform best practices for volunteer planting programs and environmental stewardship, particularly related to communities' adaptive capacities for climate change. We are requesting $188,214 and will have $198,334 matching funds, mostly in-kind, from participating groups to perform this large-scale, holistic assessment of urban tree-planting programs.

PROPOSAL OUTLINE: (The Innovation proposal is not to be more than 10 single spaced pages.) Please make sure each page is numbered and has the project title.

1. **Category Application**

2. **Scope and Applicability/Justification- Proposal objectives:**

3. **Literature Review: (Appendix and cited in narrative where applicable)**

4. **Organization/Methodology:**

5. **Product:**

6. **Collaboration:**

7. **National Distribution/Technology Transfer of Your Findings:**

8. **Project Evaluation:**

9. **Experience/Personnel/Adequacy of Resources: (Appendix)**

10. **Budget and Funding (Appendix)**

Attachments for Appendix:

SF 424, SF 424 (a) and SF 424 (b) (Make sure DUNS number is on SF424 form)
A copy of indirect cost rate or negotiated rate with cognizant Federal agency
List of Literature reviewed and cited. Make sure narrative statements based on the literature review is cited
Letters of Partnership from Partners
Letters of Support from Stakeholders

PROPOSAL OUTLINE:

PROPOSAL OBJECTIVES AND SCOPE

ORGANIZATION/METHODOLOGY

Young Tree Re-Inventory Protocol
Social and Indirect Effects Protocol
Existing Data from Nonprofit Organizations, U.S. Census, and Spatial Datasets
Analysis

COLLABORATION AND PARTNERSHIPS

Application of Protocols to Eight Cities with Urban Tree-Planting Programs
Project Management and Partner Responsibilities

DELIVERABLE PRODUCTS

NATIONAL DISTRIBUTION AND TECHNOLOGY TRANSFER

PROJECT EVALUATION CRITERIA

APPENDIX

Part A: Literature Review

Definitions of Key Terms
Tree Growth and Survival
Social Benefits of Tree Planting, and Urban Greening
Collective Action, Social Capital, and Co-Production
Climate Change, Adaptive Capacity, and Tree Planting
Our Research
References

Part B: Budget & Funding

Budget Justification
Narrative Budget Table
Cost-Share Information
Federal Financial Application Forms
Indirect Cost Rate Statement

Part C: Personnel & Organizational Capacity

Urban Forestry/Urban Ecology Research at CIPEC, Indiana University, Bloomington
Resources at CIPEC

Part D: Letters of Partnership from Partners

Part E: Letters of Support from Stakeholders