

**Environment and Natural Resources Trust Fund
2017 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 149-E

Climate-Smart Cities: Helping Cities Make Smarter Land-Use Decisions

Category: E. Air Quality, Climate Change, and Renewable Energy

Total Project Budget: \$ 288,800

Proposed Project Time Period for the Funding Requested: July 2017 - October 2018

Summary:

Develop a decision-support tool which allows cities and watershed-districts to identify and plan land-use responses at the parcel-level to address climate adaptation and green infrastructure needs in Minneapolis/Saint Paul.

Name: DJ Forbes

Sponsoring Organization: The Trust for Public Land

Address: 2610 University Ave, Ste 300
St. Paul MN 55407

Telephone Number: (651) 999-5325

Email dj.forbes@tpl.org

Web Address https://www.tpl.org/our-work/minnesota

Location

Region: Metro

County Name: Hennepin, Ramsey

City / Township: Minneapolis and St. Paul

Alternate Text for Visual:

An Example of a Climate-Smart Cities Decision-Support Tool - New York City

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____ %



I. PROJECT STATEMENT

Local land-use decisions should incorporate climate change based weather occurrences such as urban heat island (UHI) and more extreme precipitation events in order to protect both natural resources and the public’s health. This project will provide decision-makers in Minneapolis and St. Paul with a way to efficiently identify and plan land-use responses at the parcel level through the creation of a Climate-Smart Cities Decision-Support Tool (CSC DST). Utilizing an established framework deployed nationally, the CSC DST will be a web-based, GIS data-driven tool, designed in partnership with local experts using data and context, that will allow municipal agencies, including watershed districts (WDs) and watershed management organizations (WMOs) in the Twin Cities to make smarter land-use decisions. Existing local spatial data will be integrated with other “connect, cool, absorb, and protect” data so users may prioritize their infrastructure investments utilizing a climate lens. This data will be informed by four core objectives from our Climate-Smart Cities program:

- Cool: Where can enhanced canopy cover, reflective paving, and other green features reduce the UHI effect to lessen public health risks and energy use on the region’s extreme heat days? Where are the biggest “hot spots”? The Twin Cities region already suffers from a high UHI (average daily urban-rural temperature difference)’, so alleviating impacts from increased heatwaves and extreme precipitation events is even more important.
• Absorb: Where can permeable green infrastructure (GI) such as “water smart” parks or schoolyards help slow and treat water where it falls in order to mitigate challenges related to flooding from microburst rain events and potential for increased stormwater runoff?
• Connect: Where are the most important “missing links” in developing fully connected walk-bike networks and public transit to meet user demand while lowering carbon emissions and air quality impacts from transit?
• Protect: Where can green buffers like waterfront parks work in synergy with natural infrastructure such as wetlands to protect our region from increasing flood risks along our waterways and their tributaries?

Unlike climate change modeling and projections which predict future temperature, precipitation and other weather-related variables, this project will produce an interactive, easy-to-use CSC DST. By identifying and prioritizing specific parcels of land for specific interventions, cities will become more climate smart through the ability to efficiently address climate change issues (e.g. mitigation of UHI and extreme bursts of precipitation), and site interventions for greatest impact (e.g. save money through stacked environmental benefits, provide benefits to vulnerable populations identified through GIS.) Cities like Providence, Dallas and Chattanooga are using similar approaches to identify and deploy certain infrastructure interventions that provide multiple benefits as well as address climate events.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Partnership Outreach, Project Team Development and Baseline Evaluation

Budget: \$64,980

Partnership is critical to the success of this project. A Project Core Team, with staff from The Trust for Public Land, Cities of Saint Paul and Minneapolis and the related Watershed Districts/Watershed Management Organizations, will help with coordination and implementation. A Technical Advisory Team of local climate experts, researchers and representatives from education institutions, agencies and organizations will provide expert review and advice for development of the CSC DST and provide an understanding of the current conditions and areas of need, and data necessary for this tool.

Table with 2 columns: Outcome, Completion Date. Row 1: 1. Establish Project Core Team and Establish Technical Advisory Team, Month 1. Row 2: 2. Current Conditions Assessments, Month 3.

Activity 2: Research/Applied Science Discussions

Budget: \$28,880

Conduct a day-long charrette to integrate related research and local expert opinion, and foster interactions among participants to explore potential collaboration necessary for the development of the CSC DST. In order to include the right partners in the charrette, we will canvas the Project Core Team and conduct a literature scan to identify key potential research partners. Phone interviews will be used to gather information and local perspectives from participants to shape the charrette agenda around strengths, weaknesses, and questions generated by current research about climate and social resiliency in the Twin Cities region. The charrette will be designed to balance both presenting research and moderating dynamic discussions. The report will consolidate charrette learnings, specify an initial library of research and GIS data needed for integration into the CSC DST, and identify additional research needs.

Table with 2 columns: Outcome, Completion Date. Row 1: 1. Engage with local research partners through phone interviews, Month 1. Row 2: 2. Hold Research Charrette to integrate local research and expert opinions into DST, Month 2-3.

1 See http://environment.umn.edu/news/twin-cities-heat-island-study-yields-surprises/



3. Produce Short White Paper on Current Research and Potential Gaps	Month 4
---	---------

Activity 3: GIS Decision Support Tool Development

Budget: \$144,400

The GIS work proposed will begin by aggregating and organizing existing data resources (including transportation/transit networks, demographic data, land use, permeable soils, stormwater, etc.), filling gaps, and then synthesizing data into climate-smart priority areas through modeling. In partnership with the Project Core Team, The Trust for Public Land will integrate these data and model results into an easy to access internet-based CSC DST available on a password-protected basis to agencies and their public and private partners. This will include training and maintenance.

Outcome	Completion Date
1. Identify Existing Resources and Intended Uses for Decision Support Tool	Month 1-3
2. Design GIS Data Framework for the Decision Support Tool	Month 4
3. Data Collection and Interpretation	Month 4-7
4. Priority Modeling – Combining Data Layers to Show Highest Value Lands	Month 5-12
5. Construct web-based Decision Support Tool followed by Training and Maintenance	Month 12-15

Activity 4: Implementation Planning

Budget: \$50,540

In parallel to the development of the CSC DST in Activity 3, work with the Project Core team to identify and evaluate “use-cases” for a pipeline of early-win implementation opportunities (e.g. through a lens of policy, community engagement, outreach, and/or project planning) and develop action plans necessary for next steps.

Outcome	Completion Date
1. Identify and Develop Use Cases and Identify Pipeline of Early-Win Opportunities	Month 1-15
2. Develop Action Plans for Project Core Team Partners	Month 12-15

III. PROJECT STRATEGY

A. Project Team/Partners

The Trust for Public Land is requesting funds to lead the project in partnership with the Project Core Team and a Technical Advisory Team (TAT). The Project Core Team, with staff from The Trust for Public Land, Cities of Saint Paul and Minneapolis and their respective WDs and WMOs, will be responsible for overall coordination of the CSC DST development and implementation. This includes guidance on potential uses of the tool to ensure that it meets the users’ needs, and assistance in gaining access to local experts and research. The Project Core Team will craft a list of TAT members during Activity 1: Partnership Development, focusing on members with expertise in planning criteria, data sources, implantation priorities, modeling approaches and iterative review of completed modeling. Prospective members include staff from: U of MN Institute on the Environment, City of Minneapolis Sustainability Coordinator, City of St. Paul Climate Resiliency working group, Metropolitan Council, MN Pollution Control Agency Climate Adaptation, Mississippi Watershed Management Organization, Capital Region Watershed District, Ramsey-Washington Metro Watershed District, MN Department of Health, Great Plains Institute, and Tree Trust.

B. Project Impact and Long-Term Strategy

Adapting our local land-use policies and local land-use decisions to efficiently develop resiliency is critical in protecting both our natural resources and our population’s public safety and health (e.g. diminishing local flooding, minimizing UHI). The project’s long term strategy is to provide local decision makers with a tool to support data-driven project development utilizing a climate change lens. Each agency will be able to better assess opportunities to pursue multiple objectives with each infrastructure project, or complementary investment, as well as help agency leaders to use a data-driven approach to define agency-wide priorities within its’ budgeting process. While this project’s geographic scope is specifically Minneapolis and St. Paul, we anticipate the learnings will inform our nationwide strategies for implementing the decision support tool at scale.

Climate change is a global phenomenon with local-level impacts that can be exacerbated by city-scale phenomena, such as the formation of UHIs or lack of adequate storm water management. While international and national policy responses are needed to address resiliency and adaptation, informed and efficient implementation at the local-level is critically needed to minimize climate change impacts on people and our state’s natural resources.

C. Timeline Requirements

If funded, this project shall take approximately 15 months; it will start in July 2017 and conclude in October 2018.

2017 Detailed Project Budget

Project Title: *Climate Smart Cities – Helping Cities Make Smarter Land-Use Decisions*

IV. TOTAL ENRTF REQUEST BUDGET 1.25 Years

BUDGET ITEM	AMOUNT
Personnel: 2 Directors - .05 FTE 9 Managers - 2.12 FTE 3 Associates - .07 FTE	\$ 169,324
Benefits for staff @ 48% of Salary	\$ 81,276
Professional/Technical/Service Contracts:	NA
Equipment/Tools/Supplies:	NA
Acquisition (Fee Title or Permanent Easements):	NA
Travel:	NA
Office related expenses directly related to direct staff	\$ 30,100
Data and printing	\$ 8,100
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 288,800

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Indirect Costs - <i>The Trust for Public Land will fundraise private funds to cover the necessary indirect costs and travel costs related to this project.</i>	\$ 111,200	<i>Pending</i>
Other State \$ To Be Applied To Project During Project Period: NA	\$ -	NA
In-kind Services To Be Applied To Project During Project Period: NA	\$ -	NA
Funding History: NA	\$ -	NA
Remaining \$ From Current ENRTF Appropriation: <i>Metropolitan Conservation Corridors Phase VIII – Strategic Lands Protection. M.L. 2015, Chp. 76, Sec. 2, Subd. 09f</i>	\$ 750,000	<i>Unspent</i>

GIS: Online Portal for Decision Support from Project Selection to Policy Measures

Climate Smart Cities Pilot:
New York City

THE TRUST for PUBLIC LAND
CONSERVING LAND FOR PEOPLE

Zoom In Zoom Out Pan Full Extent Previous Extent Measure Length Measure Area Identify Reset Map

DATA

Map Background:

Street Map Terrain Map Aerial Imagery

Analysis Data:

[Data Sources](#)

- Parcels At Risk of Coastal Flooding
- Risk of Coastal Flooding
- Critical Infrastructure
- Social Vulnerability
- Green Infrastructure Opportunities

Data Transparency:



Analysis Results:

[Data & Methodology](#)

- Turn off Analysis Results
- Priorities for Green Infrastructure
 - Overall Priorities for Green Infrastructure
 - > Risk of Coastal Flooding
 - > Critical Infrastructure
 - > Social Vulnerability
 - > Green Infrastructure Opportunities

Results Transparency:



Sea Level Rise
and Storm Surge

Waterfront Features—
Natural and Built

Demographic
Vulnerabilities

Existing Plans and
Strategic Criteria

Organization Description and Project Manager Qualifications

Established in 1972, The Trust for Public Land is a national nonprofit organization that has created 5,000 new public places that serve over 7 million people, including a wealth of urban greening projects in cities across America. Our mission is to create parks and protect land for people ensuring healthy, livable communities for generations to come. We maintain an excellent reputation in the fields of real estate, public finance and research, urban planning, and GIS mapping.

Distinct from many national conservation organizations, which have a more traditional focus on natural area conservation, our “Land for People” mission has led us to multi-year investments in urban public places. Building on its history in urban conservation, The Trust for Public Land launched the Climate-Smart Cities program in 2010 to develop multiple-benefit natural areas that perform important functions for cities. Targeted at carbon mitigation, resilience, and vulnerable communities, this work is organized through a national strategic framework of four interconnected objectives for climate-smart urban greening:

- **Connect:** "Hyper-connect" walk-bike corridors and public transit at the city and regional scales to maximize potential mode shift toward carbon-free and resilient transportation options.
- **Cool:** Utilize specially designed urban green spaces, highly reflective surfaces, and strategically sited shade trees to lessen the energy use and human health impacts resulting from the urban heat island effect.
- **Absorb:** Use climate scenario data to guide science-based deployment of wetlands, "water smart" parks and playgrounds, green alleys, and other permeable surfaces to recharge local aquifers, curb stormwater runoff pollution and inundation, and reduce energy used for water treatment and conveyance of public water supplies.
- **Protect:** Create strategically-sited waterfront parks and living shorelines to protect cities from sea level rise and storm surge, river-borne flooding, and other related inundation threats.

The Climate-Smart Cities program has two national strategies. First is to pursue multiple-benefit opportunities wherever possible. Our goal is to help cities apply the science, spatial decision support, and project design expertise to find neighborhoods and sites where these multiple-benefits can be realized through a single strategic investment. A second fundamental overlay for all of our Climate-Smart Cities work is social equity, often referred to as “climate justice.” To integrate climate justice in our work, we apply social, demographic, and health analyses as an overlay to our “connect, cool, absorb, protect” framework, ensuring that vulnerable populations are prioritized for green infrastructure investments and policies. For example, using spatial data to understand which urban neighborhoods have a high level of seniors, a strong urban heat island, and low urban tree canopy can help prioritize “cool”-related green infrastructure efforts since seniors are much more likely to suffer health impacts during summer heat waves.

The foundation of the Climate-Smart Cities program nationally is to anchor climate-smart urban greening in scientific principles and data. We are challenging ourselves and our partners to root all of our urban greening in these quantifiable metrics. These data include urban heat mapping and modeling with Georgia Tech, flood-related mapping with Drexel and Columbia, and globally-unique carbon emissions data from Arizona State University’s Hestia Project. Importantly, we are also correlating these structural considerations for green infrastructure development with spatial data on social and demographic vulnerability indicators. Our project evaluation nationally examines how effectively we have merged the intersection of carbon/vulnerability metrics with these human factors.

The Climate-Smart Cities program has established nationally recognized tools to deliver this strategy, including our award-winning GIS applications. Our GIS-based decision support tools provide unparalleled capacity for The Trust for Public Land and our partners to evaluate our work

against these metrics — all the way to the parcel level. This capacity is the result of custom JavaScript coding developed by The Trust for Public Land that enables us to tag parcels and block groups with detailed data attributes, and to allow users to query those attributes and report on them quickly and accurately. In addition to this evaluation capacity at the project and neighborhood level we have also developed a “Measures of Progress” tool to compile city-scale statistics of project accomplishments against these metrics cumulatively over the multi-decadal implementation cycle that is ultimately envisioned for each of our city and metro-scale efforts.

The Trust for Public Land’s Climate-Smart Cities GIS was featured in a special display at the 2014 Esri International Users Conference, and our web-based Urban Heat Risk Explorer application was named a runner-up in the highly competitive Climate Resilience App Competition sponsored by the White House Climate Data Initiative and Esri. Our heat related GIS work was also recognized by the White House Climate Data Initiative as a leading partner commitment in its summer 2014 press release. Our on-the-ground green infrastructure creation has also garnered national recognition, including our New York City and Philadelphia Green Playgrounds, Chicago’s 606 Corridor, and San Francisco’s Boedekker Park.

Further, we have developed complementary tools to our decision support to quantify the climate benefits of proposed and completed actions. This includes our suite of methodologies developed for The Trust for Public Land by ICF International and summarized in the report, *Quantifying the Greenhouse Gas Benefits of Urban Parks*.

Synthesizing these skills through our replicable national model for Climate-Smart Cities, we have established on-the-ground pilot activities in direct partnership with cities big and small – including New York City, Los Angeles, King County (WA), Chattanooga, and Boston. Each pilot uses the same synthesis of applied research through university partners, online GIS decision support, and demonstration projects. We have an additional five cities ready to launch in 2016 or early 2017 using this same approach. As such, this work in the Twin Cities will have national impact as a demonstration for how our future pilots can move to the metro scale

Below are brief biographies of The Trust for Public Land staff which are anticipated to be involved with this project.

This project will be managed by **DJ Forbes, The Trust for Public Land’s Minnesota Program Manager**, who will maintain the day-to-day relationships within the project team and will manage the research charrette and implementation process. DJ equally supports local Parks for People and Our Land and Water initiatives; helping to create parks and protect land for people in both urban and rural areas. DJ has a MA in Urban and Environmental Policy and Planning from Tufts University and a BA in Geography and History from DePaul University.

Jenna Fletcher, The Trust for Public Land’s Minnesota Program Director, will direct the project and manage the high-level partnerships with the cities, agencies, and universities. She will provide strategic oversight to ensure the project delivers the desired outcomes. She will manage relationships with individuals to provide the resources to empower the project to succeed. Jenna is the Parks for People program leader in the Twin Cities, focused on creating, rebuilding and connecting parks, trails and natural areas in Minneapolis, St. Paul and first-ring suburbs, with focus on community engagement and creative place-making work that is essential to successful park development. Her interests include conservation economics, finance, and GIS analysis. Jenna has also worked for the State of Minnesota as a policy analyst on forestry issues, and researched urban smart growth practices for ICF Consulting, a national environmental public policy consulting firm. Jenna has both a Masters in Conservation Biology and an MBA from the University of Minnesota, and is a graduate of Carleton College.

Jad Daley, The Trust for Public Land’s Climate Conservation Director, guides TPL’s climate policy work, including roles as founding co-chair of the Forest-Climate Working Group – the

leading coalition of forest industry, private landowner, carbon, and conservation interests promoting U.S. forests as a tool for climate change mitigation and adaptation. Daley has been newly nominated to serve as a member of the public-private national council established by the Obama administration to guide the work of the federal Landscape Conservation Cooperatives. From 2000 to 2008, he led the 22-state Eastern Forest Partnership, a joint federal advocacy effort among groups from Mississippi to Maine. In these roles he helped to author two programs enacted within the 2008 Farm Bill, the Community Forest and Open Space Conservation Program and Community Wood Energy Program, leading lobbying efforts to enact the Highlands Conservation Act. Daley is a graduate of Peddie School, Brown University, and Vermont Law School, where he earned a master of studies in environmental law summa cum laude.

Holly Elwell, The Trust for Public Land's Climate-Smart Cities Program Manager, manages the project pipeline and implementation of TPL's climate adaptation and mitigation work. In this role, she is responsible for developing and managing science-based partnerships with academic institutions and consulting firms; coordinating the implementation of GIS web-based decision support tools with internal and external partners; and partnering with field staff to identify and develop projects. Prior to joining TPL, she was an Oak Ridge Institute for Science and Education Fellow with the U.S. EPA Office of Water, and was also an Environmental Planner with the Horsely Witten Group, Inc., a full-service environmental science and engineering firm. Elwell has a MA in Urban and Environmental Policy and Planning from Tufts University and a BA in Environmental Studies: Community and International Development from the University of Vermont.

Shaun O'Rourke, The Trust for Public Land's Director of Green Infrastructure, has in depth experience in using landscape as infrastructure; he Co-Chairs an Urban Resilience Grant at the Urban Land Institute, was appointed to the City of Boston Climate Adaptation and Preparedness Committee, and serves on the Urban Land Institute – Boston's Sustainability Committee and Sea Level Rise Committee. Prior to joining TPL, O'Rourke was the Director of Sustainable Design and a Faculty member in the School of Landscape Architecture, both at Boston Architectural College. In this role, he was responsible for all administration, program development, and curriculum planning for the undergraduate, graduate, and continuing education programs in sustainable design; managing over 80 onsite, online and low-residency course offerings per academic year; developing and administering an annual budget exceeding \$500,000; and developing and implementing annual marketing/branding strategy for print, online, and social media. He was previously an Ecological Designing for AECOM and a USDA Forest Service Technical Assistant in New York. O'Rourke holds a Master of Landscape Architecture degree from the SUNY College of Environmental Science and Forestry, and a Bachelor of Science degree in Recreation Management from the University of Vermont's Rubenstein School of Natural Resources.

Chris David, The Trust for Public Land's GIS Project Manager, leads the GIS development of TPL's Climate-Smart Cities projects nationwide. Chris's expertise is in GIS project design and modeling, site suitability, and GIS science. He has over 10 years of experience in the GIS field and has worked for the District of Columbia Office of Planning and with NOAA as an Environmental Planner.