

**Environment and Natural Resources Trust Fund  
2015 Request for Proposals (RFP)**

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**Project Title:**

**ENRTF ID: 068-C**

Stewardship Science: Enhancing education in Underserved Urban Communities

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**Category:** C. Environmental Education

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**Total Project Budget:** \$ 111,887

**Proposed Project Time Period for the Funding Requested:** 3 years, July 2015 - June 2018

**Summary:**

Make environmental science tangible for urban high school students through collaborations with university students on agroecology and native wildflower biodiversity projects. Attractive local projects expose underserved communities to environmental research.

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**Name:** Adam Kay

**Sponsoring Organization:** University of St. Thomas

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St. Paul MN 55105

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**Location**

**Region:** Metro

**County Name:** Ramsey

**City / Township:** Saint Paul

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**Alternate Text for Visual:**

Stewardship science benefits Minnesota through beautification of public spaces with native species, providing employment and college preparation for underserved student populations, and providing food donations to local food shelves.

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



**Environment and Natural Resources Trust Fund (ENRTF)**

**2015 Main Proposal**

**Project Title:** Stewardship Science: Enhancing education in underserved urban communities

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**I. PROJECT STATEMENT**

Pressing global ecological challenges create an urgent need to recruit students into environmental science. Environmental science activities that engage underserved youth are particularly valuable in Minnesota given our state’s wide achievement gap between minority and white students. We will help close this gap by incorporating urban high school students into collaborations on projects in urban agriculture and native wildflower biodiversity. One project, “Growing Science”, will develop vegetable gardens at Parks and Recreation centers to test how composting techniques affect yields and environmental impacts. The other project, “Helpful Flowers”, will develop native wildflower plots in an urban transition zone to test whether plant biodiversity can remediate contaminated soils. Together, these projects will provide a unique combination environmental education, at-risk youth employment, impactful research, urban renewal, and community service. We predict our projects will impact over 3,000 students and community members, and will provide a blueprint for significant future expansion.

Our overall GOAL is to combine publishable environmental science research with community service to create engaging educational experiences for urban youth and other community members. Main OUTCOMES from this work will be educational and employment activities for at-risk youth, research and mentoring experiences for university students, experimental results that will impact the scientific community, beautification and revitalization of urban areas, development of infrastructure for local food production, increased public awareness of challenges to native species, and strengthened connections among diverse communities.

We will accomplish this goal by teaming high school students and undergraduates on projects that are currently under construction. “Growing Science” is an extension of the University of St. Thomas’ Stewardship Garden project, which combines agroecological research, education, and community service (e.g., produce donations). In 2014, we will establish similar sites at two St. Paul Parks and Recreation centers. Also in 2014, we will create the “Helpful Flowers” project in downtown St. Paul’s Pedro Park. We request funding to implement an intensive student training program at these sites, and to extend the educational experience to a wide range of community residents through outreach activities.

**II. PROJECT ACTIVITIES AND OUTCOMES**

**Activity 1: Environmental science education through urban agriculture**

**Budget: \$55,943**

We will team University of St. Thomas (UST) undergraduates with high school students recruited through our partner, Urban Roots, which uses urban agriculture as a centerpiece of its youth development program. Growing Science will add an impactful research experience to this development program to make university-level science education a more tangible goal for participants who have traditionally not pursued science degrees. At each of two sites, we are establishing 32 2m-x-2m experimental plots (raised beds). Our main research question, formed from a survey of urban farmers, focuses on yields and environmental impacts associated with alternative composting techniques. High school participants will help conduct this research, and will receive summer employment and academic credit from UST for their work. UST students will receive integrative science training in field research and biochemical analysis, and will also receive mentoring experience. Produce from Growing Science will be donated to a local food shelf (community partner Neighbors Inc.), to Parks and Recreation centers for youth cooking and nutrition classes, and to UST for campus nutrition and food awareness programs.

<b>Outcome</b>	<b>Completion Date</b>
<i>1. Create undergraduate-high school student teams and incorporate them into research</i>	<i>July 2015</i>
<i>2. Conduct agriculture experiments over 2.5 growing seasons</i>	<i>October 2017</i>
<i>3. Donate 18,000 lbs.(3000 lbs/garden/yr) of produce to food shelves and nutrition programs</i>	<i>October 2017</i>



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4. Assess student and community impact of program	December 2017
5. Support 5 student presentations at meetings and publish 2 scientific papers	June 2018

**Activity 2: Education, native species biodiversity research, and urban revitalization**      **Budget: \$55,943**

We will establish undergraduate-high school student collaborations to test whether native wildflower biodiversity increases uptake of heavy metals (phytoremediation) from contaminated urban lands. Our teams will work in downtown St. Paul’s Pedro Park, one of the over 6,000 vacant lots in St. Paul that have significant soil contamination. We will use native wildflowers and known metal hyper-accumulator species to conduct original research on whether mixed species assemblages (biodiversity) are more effective in phytoremediation than monocultures. Our artist collaborator (Lovelee) will create a striking natural landscape, and thus convert this lot into an attractive meeting place for local residents. We will hold multiple events (picnics, music, talks, film screenings) at both Growing Science and Helpful Flowers sites to increase community involvement and raise awareness about food security, biodiversity loss, and urban renewal.

<b>Outcome</b>	<b>Completion Date</b>
1. Create undergraduate-high school student teams and incorporate them into research	July 2015
2. Conduct biodiversity-phytoremediation experiments over two growing seasons	October 2017
3. Hold eight community events at the sites over two seasons	October 2017
4. Assess student and community impact of program	December 2017
5. Support 5 student presentations at meetings and publish 2 scientific papers	June 2018

**III. PROJECT STRATEGY**

**A. Project Team/Partners**

**Project partners receiving funds:** Adam Kay, Gaston Small, UST - Organize research activities. Mentor students. Disseminate findings; Amanda Lovelee, Public Art Saint Paul’s City Artist in Residence– Design artistic elements; Tamara Schwei, Urban Roots – Organize development activities for high school students.

**Project partners not receiving funds:** Elise Amel, UST - Assessment of impact on students, organizations, and communities; Mark Granlund, St. Paul Parks and Recreation - Integrate Growing Science with youth programs; Shari Hanson, Neighbors, Inc. food shelf- Provide service activities

**B. Project Impact and Long-Term Strategy**

Impact: Our project will provide environmental education for over 3,000 students and community members. Twenty-four high school students from underrepresented groups will be primary collaborators and will serve as ambassadors for the program. These students and UST student partners will present their research to K-12 classes in the region. Growing Science sites will also impact hundreds of students per year through programs associated with St. Paul Parks and Recreation. Helpful Flowers will significantly increase access to environmental education through community meetings and other events hosted in its prominent downtown location. In addition, the projects will generate publications on urban agriculture and phytoremediation, provide useful information for local urban farmers, enhance community aesthetics, and contribute to local food programs. Long-term strategy: We aim to create a self-sustaining project. After the funding period, we will generate revenue for supplies and student salaries through produce sales to Dining Services at UST.

**C. Timeline Requirements**

We have completed pilot versions of Growing Science and Helpful Flowers at UST, and are establishing both projects on off-campus locations in summer 2014. We will conduct research activities for two growing seasons to ensure thorough hypothesis testing, to train more students, and to help make a lasting impact on communities.

## 2015 Detailed Project Budget

**Project Title: Stewardship Science: Enhancing education in underserved urban communities**

### IV. TOTAL ENRTF REQUEST BUDGET 3 years

<b>BUDGET ITEM</b> (See "Guidance on Allowable Expenses", p. 13)	<b>AMOUNT</b>
<b>Personnel:</b>	
Adam Kay, Project manager. 1/2 month salary (4.17% effort) per yr (\$11,916 for 3 yrs) plus 7.65% fringe (\$911/3 years)	\$ 12,827
Gaston Small, Co-project manager: 1/2 month salary (4.17% effort) per yr, (\$10,500 for 3 yrs), 7.65% fringe (\$803 for 3 yrs);	\$ 11,303
High school interns: 9 students each summer for 3 yr, 20 hrs/week for 12 weeks @ \$10/hour. 7.65% fringe.	\$ 69,757
<b>Contracts:</b>	
Tamara Schwei, Urban Roots – Coordinate high school student recruitment. Integrate activities with school district.	\$ 6,000
Amanda Lovelee, Public Art Saint Paul’s City Artist in Residence– Design and develop artistic elements.	\$ 6,000
<b>Equipment/Tools/Supplies:</b>	
Seeds (\$500 per site per year. 3 sites for 2 yrs)	\$ 3,000
Fertilizer and mulch (\$500 per site per year. 3 sites for 2 yrs)	\$ 3,000
<b>Acquisition (Fee Title or Permanent Easements): N/A</b>	
<b>Travel: N/A</b>	\$ -
<b>Additional Budget Items:</b> City lot leases. Leases to be held by the University of St Thomas	
<b>TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =</b>	<b>\$ 111,887</b>

### V. OTHER FUNDS

<b>SOURCE OF FUNDS</b>	<b>AMOUNT</b>	<b>Status</b>
<b>Other Non-State \$ To Be Applied To Project During Project Period:</b> <i>UST summer support for two undergraduate students each year for three years</i>	\$ 28,800	<i>Indicate: Secured</i>
<b>Other State \$ To Be Applied To Project During Project Period:</b> N/A	\$ -	
<b>In-kind Services To Be Applied To Project During Project Period:</b> N/A	\$ -	
<b>Funding History:</b> N/A	\$ -	
<b>Remaining \$ From Current ENRTF Appropriation:</b> N/A	\$ -	

# Stewardship Science: Enhancing education in underserved urban communities



Summer employment, college preparation for underserved students



Urban beautification with native species



Outreach events about biodiversity and agroecology

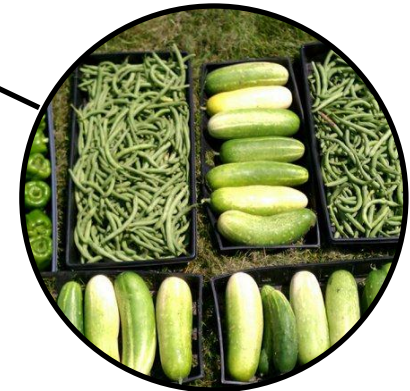
University-high school student collaborations in urban ecology



Impactful, student-led research in environmental science



Nutrition programs



Community service through produce donations

## **Project Manager Qualification & Organization Description**

Adam Kay, University of St. Thomas

**PROJECT TITLE:** Stewardship Science: Enhancing environmental education in underserved urban communities

Adam Kay is the Director of Environmental Science and Associate Professor of Biology at the University of St. Thomas (UST). Kay has extensive experience developing and implementing projects that integrate student research and community service activities. He is the founder of the UST Stewardship Garden, an on-campus community garden designed as an ecological research site. Since its inception in 2010, the Garden has been used to investigate how conventional vs. organic fertilizer influences the effect of crop diversity on yield. The project has also yielded over 6,000 lbs. of produce that has been donated to local food shelves. Kay also founded the Corner Store Procurement Project. This project combines research on worm composting and crop yields with service to the Minneapolis Healthy Corner Store Initiative, a program designed to increase access to fresh vegetables in low-income neighborhoods. Overall, Kay has mentored over 35 undergraduate research projects since 2004. Fourteen of these projects have led to presentations at national meetings and 16 of them have led to publications. Overall, he has published 31 peer-reviewed papers since 2004, and has received major funding from the National Science Foundation and Merck-AAAS.

The University of St. Thomas (UST) is the largest private university in Minnesota. Its mission is to educate students to be morally responsible leaders who think critically, act wisely, and work skillfully to advance the common good. UST is well suited to host this project because it has invested in the infrastructure, faculty resources, and student funding that can support large scale projects. The Biology Department at UST has well-equipped research laboratories. PI Kay receives one course release per semester for mentoring research students. In addition, Kay receives \$4000 - \$5000 per faculty member annually in supply money, plus additional funds to hire two full-time undergraduate researchers each summer. A UST internal program also offers stipends and housing grants for student research during the school year and summer.