



# Environment and Natural Resources Trust Fund

2021 Request for Proposal

## General Information

**Proposal ID:** 2021-085

**Proposal Title:** Ecosystem Benefits From Urban Agriculture

## Project Manager Information

**Name:** Valentine Cadieux

**Organization:** Hamline University

**Office Telephone:** (651) 523-2051

**Email:** kvcadieux@hamline.edu

## Project Basic Information

**Project Summary:** Our multidisciplinary team will synthesize information using the Urban InVEST model in an environmental education program for practitioners and policy makers demonstrating how to optimize conservation benefits of urban agriculture.

**Funds Requested:** \$200,000

**Proposed Project Completion:** 2023-12-31

**LCCMR Funding Category:** Small Projects (H)

**Secondary Category:** Environmental Education (C)

## Project Location

**What is the best scale for describing where your work will take place?**

Region(s): Metro

**What is the best scale to describe the area impacted by your work?**

Region(s): Metro

**When will the work impact occur?**

During the Project

## Narrative

### **Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.**

Land management practices for urban food cultivation can confer many conservation benefits and ecosystem services, including: (1) building soil organic matter, and hence (2) significant carbon sequestration, (2) nutrient retention, (3) stormwater holding, and (4) soil remediation, as well as (5) habitat for pollinators and urban biodiversity conservation, and (6) mitigation of urban heat island effects. Our research team has documented these ecosystem services on urban farms and gardens compared to urban turfgrass.

Despite the accrual of additive conservation benefits of long-term urban agriculture and urban farmers' demonstrated commitment to conservation when supported, most urban food production currently takes place in short term gardens on marginal land, conditions that disincentivize conservation practices. Decision-making processes at both the lot and landscape scale rarely have access to adequate knowledge about best practices to inform the development and maintenance of urban food cultivation landscapes with significant multifunctional conservation benefits. This lack of decision support is being felt keenly and communicated to us by city and county officials. Anticipated disruptions to food supply chains due to the current pandemic and climate instability, and associated demand for local land access for food production, exacerbate the need for education to optimize conservation benefits of urban agriculture.

### **What is your proposed solution to the problem or opportunity discussed above? i.e. What are you seeking funding to do? You will be asked to expand on this in Activities and Milestones.**

This environmental education project will deliver a community lab curriculum on "urban agriculture ecosystem benefits," developed as part of a prior three-year, multi-component research project (funded federally by SARE, NSF, and local funders, including UMN). Our multi-disciplinary team has researched the ecosystem services of urban agriculture in several community-engaged sites across the Twin Cities Metropolitan Region. Our project proposes to build on the research at these sites by turning our previously-used research plots into demonstrations with environmental education programming. This programming targets three main audiences: (1) urban farmers and gardeners who have asked for education about the research methods and findings, to help build their sites into venues for urban food cultivation environmental education and knowledge sharing; (2) neighbors, passersby, and members of the public we can engage and educate in best practices with signage, demonstration projects, and programming; and (3) policy makers seeking best management practices for urban agricultural land. We will leverage ongoing work by collaborators, the University of Minnesota's Natural Capital Project team, who have developed predictive models of these urban ecosystem services (Urban InVEST software) and together we will illustrate to urban agriculturalists and land policy makers how urban agriculture might enhance the above benefits.

### **What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?**

This environmental education project will deliver a community lab curriculum on "urban agriculture ecosystem benefits," developed as part of a prior three-year, multi-component research project (funded federally by SARE, NSF, and local funders, including UMN). Our multi-disciplinary team has researched the ecosystem services of urban agriculture in several community-engaged sites across the Twin Cities Metropolitan Region. Our project proposes to build on the research at these sites by turning our previously-used research plots into demonstrations with environmental education programming. This programming targets three main audiences: (1) urban farmers and gardeners who have asked for education about the research methods and findings, to help build their sites into venues for urban food cultivation environmental education and knowledge sharing; (2) neighbors, passersby, and members of the public we can engage and educate in best practices with signage, demonstration projects, and programming; and (3) policy makers seeking best management practices for urban agricultural land. We will leverage ongoing work by collaborators, the University of Minnesota's Natural Capital Project team, who have developed predictive models of

these urban ecosystem services (Urban InVEST software) and together we will illustrate to urban agriculturalists and land policy makers how urban agriculture might enhance the above benefits.

## Activities and Milestones

### Activity 1: Create signage and programming for urban agriculture demonstration sites to deliver environmental education at the neighborhood scale

**Activity Budget:** \$94,405

#### Activity Description:

Based on three+ prior years of research on urban agriculture ecosystem benefits, we will craft a library of signs and demos to be featured at 20 sites, explaining the six core components of the project:

- insect biodiversity: "lens on bugs"
- view below the soil: bio-geo-chemistry at the soil/compost intersection
- stormwater retention capacity of urban agriculture, compared to impervious surfaces and lawn
- urban agriculture soil carbon building processes
- urban agriculture soil remediation processes
- urban agriculture urban heat island mitigation processes.

These six components anchor our environmental education curriculum. Each sign corresponds to a demonstration developed by that part of the project's lead (listed in Project Collaborators). The core project team will recruit (and provide stipends to) fifteen community collaborators in each season to deliver demonstrations, using a train-the-trainer model to share knowledge: six modules at 20 sites. In the first field season, we will work with a graphic designer and community testers to develop effective templates to be used throughout the project as signage specifics need updating. Each site's set of signs will feature the six components on three double sided outdoor-material lawn-style signs, to be able to rotate featured content over the summer, corresponding to demonstration workshops.

#### Activity Milestones:

| Description  | Completion Date |
|--|-----------------|
| Evaluation of comprehension and application to management practices, end of first year (repeated if useful)        | 2021-10-31      |
| 15 community educators engage 40 people/year each (average) x 3years across six demonstration workshops            | 2023-09-30      |
| Year 3 goal: establish new educational sites in areas developing new urban agriculture with conservation focus     | 2023-10-31      |
| 6 demonstration signs about the 6 core ecosystem services installed at 20 sites per year                           | 2023-10-31      |
| Manager and assistant(s) coordinate curriculum documentation with team, publish scholarly report, share on website | 2023-11-30      |

### Activity 2: Assessment and demonstration of several ecosystem services of urban agriculture using InVEST software

**Activity Budget:** \$42,992

#### Activity Description:

We will assess the environmental benefits ("ecosystem services") or costs provided by urban agriculture to people living near these areas. Assessed services will include pollinator habitat, urban heat island mitigation, biodiversity, carbon sequestration, and stormwater retention; services within the immediate vicinity of urban gardens and at larger (neighborhood or city) scale will be investigated. We will assess baseline services as well as change (improvement) in services for implementation on urban agriculture of potential conservation or management practices. These practices will be developed from the literature and results of current work by project team members. For ecosystem service assessments, we will use the InVEST software tools, developed by the Natural Capital Project (UMN, Stanford, others) and currently being adapted by members of the project team for use in urban areas. InVEST will use available land cover and spatial data for the Twin Cities and potentially Rochester and Duluth, but urban agriculture-specific parameters will



be determined from field data collection efforts (e.g. insect surveys, runoff sample collection, air temperature monitoring) of previous and concurrent projects. Model output, as local maps of ecosystem services, will be used in educational materials developed in Task 1 and facilitate outreach activities of Task 3.

**Activity Milestones:**

| Description  | Completion Date |
|--|-----------------|
| Refinement of models for scenarios emerging in policy education convenings delivered year 2                          | 2021-06-30      |
| Models of pollinator habitat, urban heat island, biodiversity assessed, output into educational materials year 1     | 2021-08-31      |
| Baseline and improvement in services comparison models developed year 1  | 2021-10-31      |
| Whole team uses first curriculum season to develop website companion with highlights of model output                 | 2021-12-31      |
| Models of carbon sequestration, nutrient and stormwater retention assessed, output into educational materials year 2 | 2022-05-31      |
| Aggregate impacts models for whole urban areas for likely emerging scenarios delivered year 3                        | 2023-06-30      |

**Activity 3: Convening decision makers and land managers for demonstrations of ecosystem services of urban food cultivation under different management conditions**

**Activity Budget:** \$62,603

**Activity Description:**

Building on consultations with representatives from conservation, planning, and policy offices in Ramsey and Hennepin Counties (as well as county public and environmental health and the Minnesota Department of Agriculture and many other interested land management organizations such as the Minnesota Land Trust), we have identified literacy gaps in many land managers’ and decision makers’ knowledge of the potential ecosystem services of urban agriculture. Our environmental education demonstrations are designed as in-person and virtual tours of notable sites, with tie-ins to the Urban InVEST models, and with foundations in the same six ecosystem services described in Activity 1. This activity builds on the basics of Activity 1 and the predictive modeling of Activity 2 to convene twelve yearly trainings across the metro in each of the three years of the project. (We will also reach out to Duluth, where interest has been expressed, Rochester, and other cities that may be interested in this project.) The basic information about how to achieve conservation benefits of urban agriculture combined with the Urban InVEST model allows us to show relevant policy makers aggregate impact of incorporating different densities of urban agriculture into the urban form.

**Activity Milestones:**

| Description  | Completion Date |
|--|-----------------|
| Virtual tours will highlight six core ecosystem services, with model output showing metro aggregate impact     | 2022-06-30      |
| From recent meetings and demand from Met Council and Counties, monthly meeting Year1 average 10                | 2022-06-30      |
| Year2 should be able to support decisions in planned redevelopment sites (Ramsey/Hennepin)                     | 2022-08-31      |
| Have supplied curriculum to all interested metro agencies/districts, reached other cities’ key decision makers | 2023-09-30      |

## Project Partners and Collaborators

| Name             | Organization                        | Role  | Receiving Funds |
|------------------|-------------------------------------|---|-----------------|
| Ben Janke        | University of Minnesota             | As a Senior Researcher on the Urban InVEST team, Dr. Janke will work under Dr. Lonsdorf's lead and be responsible for generating local maps of ecosystem services of urban agriculture to support and illustrate the environmental education signage, programs, and workshops.  | Yes             |
| Pamela Rice      | Agricultural Research Service, USDA | As a Research Chemist focusing on Environmental Toxicology, Dr. Rice is contributing to the soil health section of our environmental education program, drawing on her research on management practices that reduce bioavailability in produce of environmental contaminants, and hence make urban agriculture better for conservation.               | No              |
| Mary Rogers      | University of Minnesota             | As a Professor of Horticultural Science and mentor to high school and college students engaging in urban agriculture, Dr. Rogers will lead the section of our environmental education program focused on invertebrate biodiversity in urban agroecosystems.   | No              |
| Gaston Small     | University of St. Thomas            | As a Professor of Biology studying biogeochemistry and the transport of nutrients in urban water and soil systems, and a mentor to high school and college students, Dr. Small will manage the segment of our environmental education program focused on Phosphorus. His participation is funded by an NSF CAREER grant.                              | No              |
| Eric Lonsdorf    | University of Minnesota             | As the Program Director of the Natural Capital Project, Institute on the Environment, Dr. Lonsdorf will direct the use of the Urban InVEST model for showing the ecosystem services of urban agriculture that we have demonstrated in our prior research.   | Yes             |
| Nicolas Jelinski | University of Minnesota             | As Professor in Soil, Water, Climate, and PI of the research project upon which this environmental education program will be built (the SARE-funded Collaborative Evaluation of Ecosystem Services Provided by Urban Agricultural Best Management Practices in the Twin Cities Metropolitan Area), Dr. Jelinski will lead the project's soil section. | No              |

## Long-Term Implementation and Funding

**Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this be funded?**

Our “urban agriculture ecosystem benefits” curriculum is designed to provide educational materials for the demonstration sites, including signage, and training to fifteen collaborators each summer for three summer field seasons. This means that over fifty people will have the training and materials to continue educating neighbors and constituents of community farms and gardens by the project completion. We are working with the MDA Emerging Farmers working group and representatives of the MN Agriculture in the Classroom committee to develop ongoing efforts for continuing decision support education.

## Project Manager and Organization Qualifications

**Project Manager Name:** Valentine Cadieux

**Job Title:** Director of Environmental Studies and Sustainability, Hamline University; Board Chair, Twin Cities Community Agricultural Land Trust

**Provide description of the project manager’s qualifications to manage the proposed project.**

Project manager Professor Valentine Cadieux directs the Environmental Studies and Sustainability programs at Hamline University, along with her research lab. She is widely published and cited in the areas of urban land management,

agricultural systems, and food justice, and has been involved with the Twin Cities Community Agricultural Land Trust (TCALT) since its founding. Her MA and PhD, from the University of Toronto Department of Geography and Planning, focused on urban agriculture and land conservation, and her undergraduate studies at Harvard were on environmental management and public engagement in conservation. She has worked in the field of environment-society research and public environmental education for over twenty years. She is a core member of several existing projects upon which this proposed environmental education will build: (1) SARE-funded “Collaborative Evaluation of Ecosystem Services Provided by Urban Agricultural Best Management Practices in the Twin Cities Metropolitan Area,” 2) USDA-funded “Farmland Access Hub” Beginning Farmer and Ranching Developing Project, and (3) the Kresge-funded “Art of Food in Frogtown and Rondo.”

This project will be a central part of the summer field education she coordinates with TCALT and Hamline University over the next three years. Professor Cadieux has been actively involved in providing tours and research demos of the four research sites of the SARE project, eight additional sites related to the Farmland Access Hub project in Minneapolis and Maplewood, and a further urban agriculture network in St. Paul related to the Art of Food. These engagements will provide core sites for environmental education activities, in partnership with community food organizations, particularly focused on the many organizations involved in these projects led by Indigenous farmers and farmers of color. This project will be a focus of Cadieux’s upcoming sabbatical, providing extra time during the first year of the project to establish a successful foundation.

**Organization:** Hamline University

**Organization Description:**

Hamline University, founded in 1854, is a liberal arts college in Saint Paul, Minnesota known for emphasis on experiential learning, service, and social justice. Hamline's mission is to create a diverse and collaborative community of learners dedicated to the development of students' knowledge, values and skills for successful lives of leadership, scholarship, and service. Hamline has 517 full-time and 305 part-time employees serving approximately 2,000 undergraduate and 1,800 graduate students. The proposed environmental education project builds on Hamline’s numerous capabilities and resources in Environmental Education, including a renowned Natural Science and Environmental Education graduate program that trains teachers and informal educators; one of the oldest Environmental Studies undergraduate programs in the state; close collaborations with the Hamline-Midway Environment Committee and many metro and statewide environmental education and advocacy organizations (including the Women’s Environment Network, and emerging Campus Farmers and Food Access networks); and consistent programming engaging various publics on matters of public administration, justice, and sustainability. These assets set the stage for Hamline's success as convenor and administrator of this environmental education program. The collaborators representing this multi-institution project have asked Dr. Cadieux, senior scholar on the project, to lead and coordinate the effort from Hamline.

## Budget Summary

| Category / Name   | Subcategory or Type | Description  | Purpose | Gen. Ineligible | % Benefits | # FTE | Classified Staff? | \$ Amount |
|---|---------------------|--|---------|-----------------|------------|-------|-------------------|-----------|
| <b>Personnel</b>  |                     |  |         |                 |            |       |                   |           |
| Project Manager   |                     | Activity 1: .25 time coordinating summer environmental education activities in urban farms and gardens, including train-the-trainer activities for demonstrations, and translation of six research finding areas into demonstrations and signage (10 hours / week, some of which will overlap with consultations with Activities 2 and 3 during this time) x 3 months of summer + 25% fringe |         |                 | 25%        | 0.06  |                   | \$22,954  |
| Project Manager   |                     | Activity 3: .125% Coordinator time x 6 non-summer months setting up, facilitating, and following up from monthly policy-maker convenings, coordinating contributions from the other team members, leading the development of educational materials from their research on the six project topics, and the support of the InVEST team on modeling these topics                                |         |                 | 25%        | 0.06  |                   | \$22,953  |
| Undergraduate and/or Community Education Assistant during summer      |                     | Activity 1: Education Assistant helps with logistics, planning, and carrying out of environmental education, supporting contributions of the six project area leads for curriculum delivery, and supporting community educators: ~13 summer weeks x ~20 hours x \$15/hour (+ 2% yearly increase): 35,256 + 7.65% tax   |         |                 | 7.65%      | 0.13  |                   | \$37,953  |
| Natural Capital Program Director (Dr. Eric Lonsdorf) Model Assistance |                     | Activity 2: 1 week, yearly (x 3), to consult and manage use of Urban InVEST Model  |         |                 | 36%        | 0.02  |                   | \$8,324   |
| Senior Researcher, InVEST Model (Dr. Ben Janke)                       |                     | Activity 2: Assessing baseline ecosystem services and change (improvement) in services for implementation of potential conservation practices; developing model outputs from the literature and results of current work by project team members: 3 months at .25 time per year x 3 years   |         |                 | 36%        | 0.06  |                   | \$27,666  |

|  |  |  |   |  |  |   |                  |                  |
|--|--|--|---|--|--|---|------------------|------------------|
|  |  |  |   |  |  |   | <b>Sub Total</b> | <b>\$119,850</b> |
| <b>Contracts and Services</b>                        |  |  |   |  |  |   |                  |                  |
| TBD Designer   | Internal services or fees (uncommon)       | Activity 1: Graphic and process design for template and layout of six signs, and programming mechanics and support materials (handouts, demonstration needs, etc.) for demonstration workshops   |   |  |  | - |                  | \$2,250          |
| TBD Community Peer Educators                         | Professional or Technical Service Contract | Activity 1: \$500 stipend to 15 workshop deliverers per year (3 years), across all 20 sites. Each trainer will be expected to deliver the demonstration training to at least six others; ideally, each will reach over 50 in each season.  |   |  |  | 0 |                  | \$22,500         |
| TBD Website, mapping, and model integration services | Internal services or fees (uncommon)       | Activities 1-3: Across the three years, \$6100 for web services (including integration of the Urban InVEST models and map outputs) to share environmental education modules online, along with documentation of on-site educational programming / virtual tours from urban farms and gardens |   |  |  | 0 |                  | \$6,100          |
|  |  |  |   |  |  |   | <b>Sub Total</b> | <b>\$30,850</b>  |
| <b>Equipment, Tools, and Supplies</b>                |  |  |   |  |  |   |                  |                  |
|  | Tools and Supplies                         | Coffee, snacks, post it notes, facilitator fees (\$1000 x 12 ~monthly training convenings x 3 years  | Activity 3: Monthly convenings with policy makers and agency staff enable us to reach the wide range of important actors with conservation decision power. MDA surveys of growers and county Commissioners show low literacy on available tools for farmland conservation, particularly in urban areas. |  |  |   |                  | \$36,000         |
|  |  |  |   |  |  |   | <b>Sub Total</b> | <b>\$36,000</b>  |
| <b>Capital Expenditures</b>                          |  |  |   |  |  |   |                  |                  |
|  |  |  |   |  |  |   | <b>Sub Total</b> | <b>-</b>         |

|                                     |                       |   |  |  |  |  |                  |                |
|-------------------------------------|-----------------------|---|--|--|--|--|------------------|----------------|
| <b>Acquisitions and Stewardship</b> |                       |   |  |  |  |  |                  |                |
|                                     |                       |   |  |  |  |  | <b>Sub Total</b> | -              |
| <b>Travel In Minnesota</b>          |                       |   |  |  |  |  |                  |                |
|                                     | Miles/ Meals/ Lodging | Mileage and travel expenses (public transportation, parking) for project team and trainers for travel to monthly workshops over three years | Activity 3: Monthly workshops will involve many of the team members monthly throughout the metro and traveling to Duluth and Rochester and possibly other cities when possible   |  |  |  |                  | \$2,550        |
|                                     |                       |   |  |  |  |  | <b>Sub Total</b> | <b>\$2,550</b> |
| <b>Travel Outside Minnesota</b>     |                       |   |  |  |  |  |                  |                |
|                                     |                       |   |  |  |  |  | <b>Sub Total</b> | -              |
| <b>Printing and Publication</b>     |                       |   |  |  |  |  |                  |                |
|                                     | Printing              | 20 sites x sets of 6 educational signs x \$40 / sign in year 1 (\$4800), plus \$450 in each of years 2 and 3 for reprinting or adding signs | Activity 1: Signs are present throughout the growing season, providing environmental education to urban farm and garden users and neighbors  |  |  |  |                  | \$5,700        |
|                                     | Publication           | Open Access Publishing Charges  | Activities 1, 2, 3: In the final year of the project, the project team will publish an open access scholarly paper reporting the content and outcomes of the environmental education workshop, making it possible for anyone interested to replicate the public curriculum |  |  |  |                  | \$3,000        |
|                                     |                       |   |  |  |  |  | <b>Sub Total</b> | <b>\$8,700</b> |
| <b>Other Expenses</b>               |                       |   |  |  |  |  |                  |                |
|                                     |                       | Stipends for user testing of the educational materials and programming in year 1  | Activity 1: \$25 stipends to 10 target audience members to user test the sign designs (\$250) + user testing / refinement with target audiences for  |  |  |  |                  | \$2,050        |

|  |  |  |  |  |  |  |                        |                  |
|--|--|--|--|--|--|--|------------------------|------------------|
|  |  |  | demos in first season: \$50 stipends for<br>6 test workshops x 6 people (\$1800) |  |  |  |                        |                  |
|  |  |  |  |  |  |  | <b>Sub<br/>Total</b>   | <b>\$2,050</b>   |
|  |  |  |  |  |  |  | <b>Grand<br/>Total</b> | <b>\$200,000</b> |

## Classified Staff or Generally Ineligible Expenses

| Category/Name | Subcategory or Type | Description | Justification Ineligible Expense or Classified Staff Request |
|---------------|---------------------|-------------|--|
|---------------|---------------------|-------------|--|



## Non ENRTF Funds

| Category         | Specific Source  | Use  | Status                 | Amount          |
|------------------|--|--|------------------------|-----------------|
| <b>State</b>     |  |  |                        |                 |
| In-Kind          | The University of Minnesota Center for Urban and Regional Affairs has supported a full term graduate research assistant to the Twin Cities Community Agricultural Land Trust.  | The work of this research assistant in 2020 has created the list of policy makers, agencies, and farmers interested in the educational convenings we are proposing, including in Ramsey and Hennepin Counties and at the Met Council.  | Secured                | \$6,000         |
| In-Kind          | University of Minnesota In Kind overhead   | 54% of the salary + equipment for anyone involved from UMN (totalling \$26463 before fringe)   | Pending                | \$14,290        |
|                  |  |  | <b>State Sub Total</b> | <b>\$20,290</b> |
| <b>Non-State</b> |  |  |                        |                 |
| Cash             | Research on nutrient retention and biogeochemistry is supported by a National Science Foundation CAREER award (award number 1651361) to GE Small   | Dr. Small's research, particularly on phosphorus, will be one of the core foundations for educational demonstrations, based on nutrient budgeting research informing best practices for aligning compost application to reduce excess phosphorus and enable urban agriculture to become a better nutrient sink, rather than source. Dr. Small's time, research expenses, and mentorship of additional students involved will all be covered by the last year of his CAREER grant overlapping with the first year of our LCCMR. | Secured                | \$100,000       |
| In-Kind          | Sustainable Resources Center, Urban Farm and Garden Alliance, and Pillsbury United: rent to use spaces   | Land use (5 SRC parcels + 6 Urban Farm and Garden Alliance parcels + 6 additional parcels = 15 parcels x 3 months x 3 years, \$33 rent per month to use space)   | Secured                | \$4,500         |
| In-Kind          | Twin Cities Community Agricultural Land Trust volunteer time   | \$3647 TCALT Volunteer time: (@MN Volunteer time rate of \$24.31/hr) Committee working on demonstration project 50 hours per year x 3 years = 150 hours  | Secured                | \$3,647         |
| Cash             | National Science Foundation Integrated Socio-Ecological Systems CNH2-L program   | Proposal under review (involving the same team) to continue research that would expand the detail of the education possible, and expand the modeling capacity. NOTE: the success of this LCCMR proposal is not contingent on this further research; the prior USDA SARE project has provided the needed research.<br><br>Proposal: "Urban agriculture as a coupled socio-ecological system: Assessing ecosystem services, and re-internalizing impacts in interactive greenspace"  | Potential              | \$1,493,670     |
| In-Kind          | The current ecosystem service project is funded by a USDA North Central Region Sustainable Agriculture Research and Education Grant (award number 00067679) and supported in part by UMN-MAES funding to N.A. Jelinski | These prior projects will be concluded by the LCCMR, but have provided the data we are building on and will leave an approximate \$10,000 of equipment, capacity, and research site infrastructure.  | Secured                | \$10,000        |

5/22/2020

|      |  |  |                            |                    |
|------|--|--|----------------------------|--------------------|
| Cash | Kresge Fresh, Local, and Equitable project Art of Food in Frogtown and Rondo | The Twin Cities Community Agricultural Land Trust will use these funds to support community organizing as part of its collaboration with this project, getting people engaged in the educational program and helping to secure further agricultural redevelopment sites. | Secured                    | \$10,000           |
|      |  |  | <b>Non State Sub Total</b> | <b>\$1,621,817</b> |
|      |  |  | <b>Funds Total</b>         | <b>\$1,642,107</b> |

## Attachments

### Required Attachments

#### *Visual Component*

File: [d6c5fc87-76b.pdf](#)

#### *Alternate Text for Visual Component*

Diagram shows how prior research outcomes inform our environmental education program about Ecosystem Benefits from Urban Agriculture. The top half of the image shows how our team has been approaching urban agriculture ecosystem services research in the Twin Cities Metro Region, at four multi-year, multi-disciplinary community-engaged research sites. The bottom half uses an example of the Urban InVEST model's assessment of how land use changes can contribute to the mitigation of urban heat island affect, showing how the findings from this research will inform assessments of the six ecosystem services that will form the basis for our program of environmental education with farmers and gardeners, their neighbors and produce consumers, and policy makers in Minnesota's nested land management system, from the neighborhood, through city, county, metro region, and state. The six ecosystem services that have been demonstrated in our research to contribute significant conservation effects from urban agriculture (insect biodiversity, stormwater retention, soil carbon building and retention, nutrient retention, soil remediation, and urban heat island mitigation) are shown as the basis for signs, programming, and policy education.

#### *Financial Capacity*

File: [99f3082b-f31.pdf](#)

## Administrative Use

**Does your project include restoration or acquisition of land rights?**

No

**Does your project have patent, royalties, or revenue potential?**

No

**Does your project include research?**

No

**Does the organization have a fiscal agent for this project?**

No

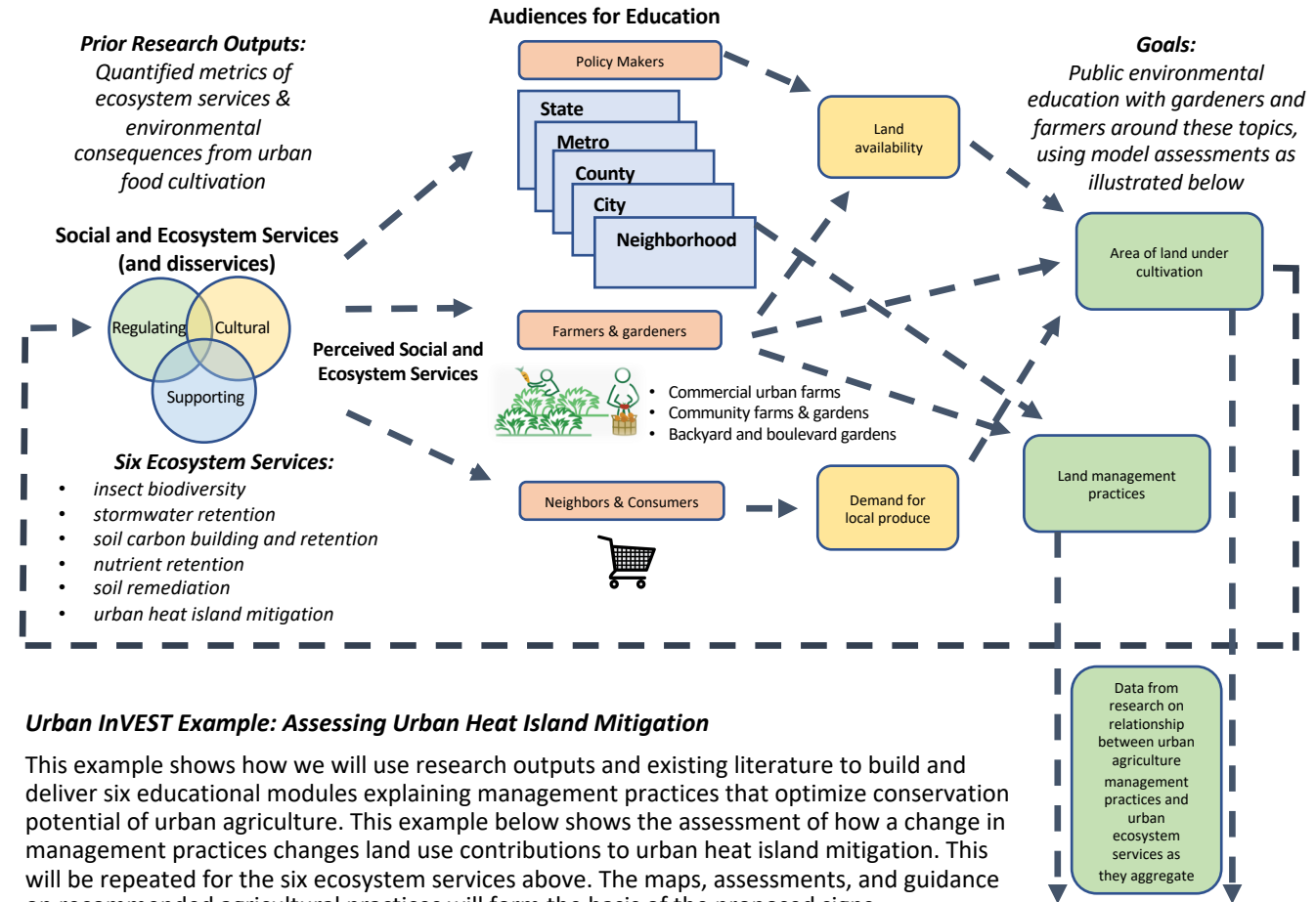
# Ecosystem Benefits from Urban Agriculture

LCCMR Environmental Education Proposal, 2021–2023

Valentine Cadieux, Hamline University, Gaston Small, University of St. Thomas, Pamela Rice, ARS, USDA

Nic Jelinski, Mary Rogers, Eric Lonsdorf, Ben Janke, University of Minnesota

This graphic below shows the focal points of a collaborative, multidisciplinary research program, developed over the past four years at four public research sites across the Metro Twin Cities. The research outputs from this research will be used in the proposed project as the basis for an environmental education program at these farm and garden sites, expanding to 20 sites in the Metro area, including redevelopment sites including urban agricultural in the long-term plan, and hopefully including sites in Duluth and Rochester.



## Urban INVEST Example: Assessing Urban Heat Island Mitigation

This example shows how we will use research outputs and existing literature to build and deliver six educational modules explaining management practices that optimize conservation potential of urban agriculture. This example below shows the assessment of how a change in management practices changes land use contributions to urban heat island mitigation. This will be repeated for the six ecosystem services above. The maps, assessments, and guidance on recommended agricultural practices will form the basis of the proposed signs, demonstration workshops, and educational convenings of policy makers and agency staff.

