Environment and Natural Resources Trust Fund

2022 Request for Proposal

General Information

Proposal ID: 2022-120

Proposal Title: Biochar Implementation in Habitat Restoration: Pilot

Project Manager Information

Name: Rebecca Tucker

Organization: Great River Greening

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Project Basic Information

Project Summary: Implement the use of biochar kilns as a low carbon emitting, biologically beneficial alternative to woody material disposal in habitat restoration projects.

Funds Requested: $176,000

Proposed Project Completion: June 30 2025

LCCMR Funding Category: Small Projects (H)

Secondary Category: Air Quality, Climate Change, and Renewable Energy (E)

Project Location

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

Region(s): Central, Metro, SE,

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

Region(s): Central, Metro, SE,

When will the work impact occur?

During the Project and In the Future

Narrative

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

Habitat restoration activities such as woody invasive species control, prairie maintenance, and structured removal of diseased trees such as oak, ash or elm can produce large quantities of physical material to be disposed of as part of the land management action. The woody biomass may be hauled off site to be burned in a bioreactor or sold to lumberyards, activities that are frequently cost-prohibitive in markets with increasingly limited outlets. Consequently, land managers frequently open burn it in piles. While this method is cost-effective in the short term, it leaves room for improvement in terms of carbon balance, reduction in soil fire scars, and in the creation of beneficial soil amendments.

Biochar is the product of burning woody material at high temperatures under low-oxygen conditions that converts biomass into a product that can be used as a soil addition for carbon sequestration, drought resistance, and microbial support in prairies, farm fields, and gardens. Biochar production releases less smoke and greenhouse gas than typical burning but requires specific physical conditions, equipment, and knowledge that land managers and natural resource practitioners may not have access to or experience with, preventing them from utilizing this method of woody material disposal and carbon capture.

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.

Great River Greening is proposing a pilot project to build and/or purchase biochar kilns and implement this method of material disposal on projects around the state to demonstrate the productive disposal of the byproducts of natural resource management activities. We will gather information on what methods have been shown to utilize wood that would otherwise have been eliminated at a cost to the land owner and a detriment to the climate, then work with municipalities, soil and water conservation districts and other land-owning partners to utilize this technique to reduce greenhouse emissions while reducing waste from land restoration actions.

Funding will support outreach on the applications of biochar production on public lands as well as in agricultural and urban areas. The message of sustainable land management practices will benefit practitioners in the short term as well as communities in the long term, increasing awareness of climate related issues and positive steps that can be taken by people in many situations. The demonstration of the direct applications of biochar kilns to landowners and natural resource practitioners will allow a broader set of organizations to include these practices in future land management activities, increasing the utilization of this material disposal technique.

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?

The demonstration of biochar production in the context of natural resource management will expand this technique to a broader group of land managers. We propose to convert the burning of brush or log piles from the conventional manner to the biochar pyrolysis method at 9 total sites throughout 3 regions of Minnesota, engaging 75 land managers and natural resource practitioners in the process. Dissemination of the efficacy of these techniques will occur to landowners, local governmental units, educational institutions, and to the significant network of project partners and contracting organizations with whom Great River Greening facilitates these habitat restoration activities.

Activities and Milestones

Activity 1: 1. Purchase and construct biochar kilns.

Activity Budget: $38,000

Activity Description:
Currently, land managers and natural resource practitioners do not have access to the physical kilns or easily implementable techniques for biochar production as a means of woody waste disposal. To reduce that barrier, we will facilitate the purchase or physical construction of multiple types of kilns that may be transported to sites for in-situ biochar production and demonstration. We will first gather information on the types, sizes, and models of kilns that are currently being produced, coordinating with local land managers and restoration professionals to confirm the applicability of these levels of biochar production, then purchase or construct 3 sets of kilns for each scale of application deemed feasible.

Activity Milestones:

Description	Completion Date
Gather information to determine the appropriate types of kilns for land management material disposal.	December 31 2022
Purchase or construct 3 sets of kilns for each scale of application deemed feasible.	June 30 2023

Activity 2: 2. Test and implement biochar kilns and burning practices.

Activity Budget: $94,000

Activity Description:
The on-site production of biochar from the woody biproducts of habitat restorations in multiple regions of the state through collaborations with land owning partners and local land managers. We will test multiple scales of biochar production and types of production methods to determine what application is realistically feasible for different types of woody removal and different types of land (WMA vs city park). This activity will support the use of kilns on 9 sites throughout the 3 proposed regions of Minnesota.

Activity Milestones:

Description	Completion Date
Define projects with land owning partners – 9 total sites throughout 3 regions of Minnesota.	June 30 2023
Test the efficacy and scale of biochar techniques in each region by facilitating kiln use.	December 31 2024

Activity 3: 3. Community involvement and outreach education.

Activity Budget: $44,000

Activity Description:
Produce and disseminate educational materials on biochar applications in natural resource projects, contextualized for land managers and natural resource practitioners. This will also involve demonstration events specifically with partners, educational institutions, land owners, and organizations that could benefit from the use of biochar kilns in habitat restoration activities.

Activity Milestones:

Description	Completion Date
Engage 75 practitioners in the use of the biochar kilns to demonstrate the biochar process.	June 30 2024
Develop materials summarizing the efficacy of the use of the kilns in different land management.	December 31 2024

Disseminate the information to 9 local governmental units, non-governmental organizations, municipalities, or service providers.	June 30 2025

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?

This is a pilot project identifying opportunities related to this material disposal technique. Long term funding and implementation is to be determined as part of the initial partner development, but may include a larger scale proposal to the Minnesota Environment and Natural Resource Trust Funds and other organizations. There is some commercial value to biochar which may be a catalyst for larger implementation in Minnesota. Biochar produced from this funding will be utilized by the land owners and Great River Greening as a beneficial soil amendment in the related habitat restoration projects but will not be sold for financial gain.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Upland and Shoreline Restoration in Greater Metropolitan Area	M.L. 2014, Chp. 226, Sec. 2, Subd. 06g	$300,000
Metro Conservation Corridors Phase VIII - Enhancing Restoration Techniques for Improved Climate Resilience and Pollinator Conservation	M.L. 2015, Chp. 76, Sec. 2, Subd. 08f	$400,000
Upland, Wetland, and Shoreline Restoration in Greater Metropolitan Area	M.L. 2016, Chp. 186, Sec. 2, Subd. 08g	$509,000
Community Stewardship to Restore Urban Natural Resources - Phase Ten	M.L. 2017, Chp. 96, Sec. 2, Subd. 08i	$524,000

Project Manager and Organization Qualifications

Project Manager Name: Rebecca Tucker

Job Title: Program Manager

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

Rebecca Tucker (M.S. Botany and Population Genetics, Purdue University), has a diverse set of experience planning, executing, and funding the restoration of native habitats. After studying wild rice for her masters, she spent three and a half years as a research assistant at the Archbold Biological Station in Florida where she carried out plant and habitat assessments, managed hydrological engineering plans, coordinated bidding and budgets for contracted restoration projects, and implemented a variety of land management activities. Before coming to Great River Greening, Rebecca was a research assistant on the University of Minnesota Healthy Prairies project. She has also engaged the public through educational talks and worked on numerous farm and greenhouse research projects at a number of organizations. Currently, as Great River Greening's Twin Cities Metro Program Manager, Rebecca develops and manages the urban enhancement and restoration within the seven county metro area focused primarily on invasive species reduction, pollinator habitat establishment, and local community outreach.

Organization: Great River Greening

Organization Description:

Great River Greening's mission is to secure the legacy of Minnesota land and water through community-based restoration, stewardship and partnership, striving to improve Minnesota's natural resources, protect clean air and water, and increase community access to sustainable open space. Since 1995, Great River Greening has engaged 47,000 volunteers (12,500 of them youth) in hands-on education and stewardship activities, helping restore over 12,000 acres

of habitat in 400 communities across Minnesota. Great River Greening focuses our work in locations and on activities that provide conservation impact, ecosystem services, and community benefits, with projects including: developing planting designs and/or restoration management plans for natural areas; planting native trees, shrubs, wildflowers, and grasses; stabilizing shorelands and ravines; conducting ecological inventories; implementing conservation practices on farmland; and completing restoration and management activities including exotic species removal, prairie seed collection, and prescribed burns. In addition, Great River Greening engages community members from schools, faith groups, civic groups, businesses, and veterans groups in public volunteer events and engages over 100 youth per year through targeted service-learning programs. Through community education and engagement, Greening is restoring natural resources, while building environmental leaders and stewards of tomorrow.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
4 Ecologists and Project Managers		Coordination with the land managers and natural resource practitioners for project implementation.			21%	0.54		$50,000
1 Grant Manager		Grant management and project implementation.			21%	0.39		$30,000
2 Outreach and Communications		Coordination of outreach and demonstration events and dissemination of informational materials.			21%	0.09		$5,000
3 Field Crew		Implementation of biochar production and on-site field work.			9%	0.18		$10,000
3 Accounting Staff		Finance administration and grant fund coordination, status reporting, and amendment communication.			24%	0.09		$5,000
							Sub Total	**$100,000**
Contracts and Services								
TBD	Professional or Technical Service Contract	Contracting land management service providers to incorporate the use of biochar kilns in the disposal of woody material on projects coordinated with Great River Greening and the land-owning partners.				-		$40,000
TBD	Professional or Technical Service Contract	The production of biochar kilns and required ancillary equipment for safe and effective use on multiple scales.				-		$10,000
							Sub Total	**$50,000**
Equipment, Tools, and Supplies								
	Equipment	Biochar kilns	Purchase a variety of kiln types to convert the waste woody material from habitat restoration activities to biochar.					$5,000

	Tools and Supplies	Biochar kiln supporting supplies.	Tools and supplies required for the safe and effective use of biochar kilns.					$2,000
							Sub Total	**$7,000**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Travel to and from project sites, partner meetings, and outreach events.	Support on-site visits and project implementation.					$3,000
							Sub Total	**$3,000**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Printing	Printing of informational material to give to land managers and natural resource practitioners.	Material will be distributed to educate land managers and natural resource practitioners on the applications of biochar kilns in habitat restoration woody material disposal.					$1,000
							Sub Total	**$1,000**
Other Expenses								
		Kiln mobilization and storage expenses	Facilitate the movement and storage of the biochar kilns.					$5,000
		Event related expenses	Tents, tables, chairs, food, latrine, etc, as required to support project demonstration and educational events in promotion of the LCCMR strategy and objectives.					$10,000
							Sub Total	**$15,000**

							Grand Total	**$176,000**

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
State				
In-Kind	Outdoor Heritage Funded projects.	These projects will support the material cutting portion of the biochar production.	Pending	$50,000
			State Sub Total	**$50,000**
Non-State				
In-Kind	Municipal and other land owning partners.	Landowner labor and time facilitating the use of biochar kilns.	Potential	$20,000
Cash	Municipal and other land owning partners.	A variety of expenses directly related to the individual landowner or partner sites such as contracting, material purchase, or indirect expenses related to the management projects.	Potential	$20,000
In-Kind	GRG administrative match	GRG staff indirect administrative expense to do the work for this grant.	Secured	$5,000
Cash	GRG cash match.	GRG direct expenses required to do the work for this grant.	Secured	$5,000
			Non State Sub Total	**$50,000**
			Funds Total	**$100,000**

Attachments

Required Attachments

Visual Component

File: b0f146a5-279.pdf

Alternate Text for Visual Component

Summary of the Great River Greening biochar grant proposal with illustrations of the biochar production process and outlines of the proposed activities....

Financial Capacity

File: dd2b16c1-ba7.pdf

Board Resolution or Letter

Title	File
GRG Board Resolution ML2022 Biochar	afbf81a7-7b9.pdf

Optional Attachments

Support Letter or Other

Title	File
GRG LCCMR Biochar Support Letter - Dovetail Partners	0cb48d54-7c7.pdf
GRG LCCMR Biochar Support Letter - Scott County	9ce43cda-ab3.pdf
GRG LCCMR Biochar Support Letter - Dakota County	4d9347ad-fb4.pdf
GRG LCCMR Biochar Support Letter - City of St Paul	ac5a0297-1e4.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Does your project have potential for royalties, copyrights, patents, or sale of products and assets?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

No

Biochar Implementation in Habitat Restoration

Air Quality, Climate Change, and Renewable Energy

GREAT RIVER GREENING
RESTORING LAND, WATER AND WONDER

Implementation of biochar kilns as a low carbon emitting, biologically beneficial alternative to woody material disposal in habitat restoration.

What is biochar?

The end-product of burning biomass under low-oxygen, temperature specific conditions. The benefits of biochar are widely applicable in MN -

- Carbon sequestration
- Incorporation in water filtration basins
- Soil microbial support and fertility

image source: www.netzero.green 3/30/2021

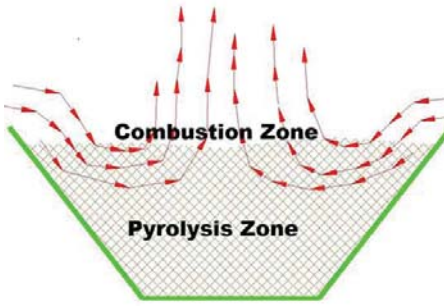

image source: www.biocharkiln.com 3/30/2021

How can biochar production (pyrolysis) be used in land management?

- Excess woody material from habitat restoration such as invasive shrubs (buckthorn) or disease impacted trees (red oak or ash) can be burned on site in kilns to produce biochar.
- Pyrolysis emits reduced greenhouse gasses compared to open burning (the typical method of material disposal).

(International Biochar Initiative, 2021, Wilson Biochar, 2021, Great Plains Institute, 2021, Bioeconomy Coalition of Minnesota, 2021)

Great River Greening inspires, engages, and leads communities throughout Minnesota in conserving and caring for the land and water that enrich our lives.

Biochar Implementation in Habitat Restoration

Air Quality, Climate Change, and Renewable Energy

GREAT RIVER GREENING
RESTORING LAND, WATER AND WONDER

Woody waste from habitat enhancement.

Biochar kiln pyrolysis
image source: www.organicfarmermag.com 3/30/2021

Biochar ready for soil amendment
image source: www.betterenergy.org3/30/2021

1. Construct Biochar Kilns

Facilitate the purchase or physical construction of multiple types of kilns that may be transported to sites for in-situ biochar production and demonstration.

2. Implement Biochar Kilns and Practices

Test multiple scales of biochar production and types of production methods to determine what application is realistically feasible for different types of woody removal and different types of land (WMA vs city park).

3. Outreach Education

Connect with land mangers, educational institutions, natural reource practioners and land owners.

- Disseminate educational material
- Conduct demonstration events