Environment and Natural Resources Trust Fund

2022 Request for Proposal

General Information

Proposal ID: 2022-212

Proposal Title: Emergency Location Markers for Minnesota's Parks and Trails

Project Manager Information

Name: Stephen Swazee

Organization: SharedGeo

Office Telephone: (651) 285-5015

Email: sdswazee@sharedgeo.org

Project Basic Information

Project Summary: Improve the enjoyment and safety of Minnesota's trails and outdoor recreational areas by accelerating installation of Emergency Location Markers (ELM) on these public lands.

Funds Requested: $198,000

Proposed Project Completion: June 30 2024

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?

Statewide

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

Statewide

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.

Numerous backcountry Search and Rescue (SAR) incidents over the years have highlighted the public often has difficulty communicating location quickly and accurately to first responders. There are multiple reasons why this is the case, some of which include cellphone GPS location reporting that is typically very poor in rural areas where recreational spaces are located, and multiple (thus confusing) versions of latitude/longitude. To solve this problem, in 2011 the National Search and Rescue Committee - comprised of the seven federal agencies involved in SAR – adopted U.S. National Grid (USNG) as the nation's geo-coordinate standard for reporting emergency locations. At about this same time, St. Paul based nonprofit SharedGeo and Lake County, Minnesota partnered on a research project which installed the nation's first standardized USNG Emergency Location Marker (ELM) system. In addition to that trail system cutting SAR response times by as much as 90%, the demonstrated value of this approach has subsequently led to adoption in seven other states, selection by NASA for use at Cape Canaveral, and National Park Service authorization as approved signage after an expansive pilot install at Kennesaw Mountain Battlefield National Park – a park which sees over 2.5 million visitors annually.

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.

SharedGeo will accelerate installation of U.S. National Grid geo-coordinate ELM systems across the state by providing consulting, planning, training and materials to support local land managers and Emergency Services Sector (ESS) personnel who wish to install ELMs in their jurisdiction. To accomplish this mission, SharedGeo will use administrative, technical and training materials it previously developed (www.usngcenter.org), as well as a core of highly experienced instructors it has worked with over the past decade. Working collaboratively with local land managers and first responders, each project team will identify optimal locations to place ELM signs. SharedGeo will then have ELM signs manufactured and shipped to the land managers for installation. An in-kind labor program will be used to qualify install proposals from around the state. It will then be up to the selected local land managers to install and maintain their respective systems. In support of this project flow, SharedGeo has previously published an ELM system basic installation planning guide (https://bit.ly/3sEVvwX) and posted a YouTube video describing the evolution of the ELM concept and how to plan for an install (https://youtu.be/dJu98jUsh9U). Per efficient use of funds, SharedGeo's 2019 project spend rating was 94%.

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?

In the same way being able to call in street address information to 911 during an emergency lends a sense of security in the urban environment, enjoyment of Minnesota's natural resources will be greatly enhanced for recreational users wherever ELM signs are located on Minnesota's parks, trails and landings. ELMs will also help land, forest, wildlife and water managers, conservation officers, firefighters and law enforcement personnel respond more quickly to emergency situations, thus maximizing their efficiency. Finally, damages to our natural resource infrastructure - trails, boat landings, bridges, etc. - can be more easily located and reported for repair.

Activities and Milestones

Activity 1: U.S. National Grid and Emergency Location Marker Training

Activity Budget: $141,000

Activity Description:
On-site regional training one day workshops (3-6) with additional on-line webinars (5-10). This would include working with first responders, emergency managers, recreational user groups, and managers for parks, forests, trails, and aquatic environments to learn the USNG ELM system and identify key, strategic locations for Emergency Location Marker placement. All elements of this training have previously been created. Informational materials would be printed and provided electronically to training attendees which would allow them to return to their communities and serve in a "train-the-trainer" capacity.

Activity Milestones:

Description	Completion Date
Present on-site and virtual workshops around the state	January 31 2023
Project proposals due from land and water managers	March 31 2023
Select proposed projects	May 31 2023

Activity 2: US National Grid Emergency Location Marker Manufacture and Installation Technical Support

Activity Budget: $57,000

Activity Description:
By July 31, 2023, all ELM signs will be manufactured and shipped to the partners for installation by June 30, 2024. The amount budgeted is for an estimated 2,000 signs @ $25/sign. ELM informational brochures will be printed and shipped; then distributed as part of the recipient's ongoing public relations program. Amount budgeted is $7,000.

Activity Milestones:

Description	Completion Date
Manufacture and ship sign orders	July 31 2023
Print and distribute locale specific ELM system informational brochures	August 31 2023
Complete follow up orders for bad or damaged signs	October 31 2023
Installation of ELMs complete	June 30 2024

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Parks & Trails, Forestry, Ecology and Waters, Fish & Wildlife Divisions	Minnesota Department of Natural Resources	Receive training on the Emergency Location Markers (ELM) system. Place and maintain ELMs at strategic locations on state trails, parks, forests, and waterways. Incorporate project provided educational materials into public outreach efforts.	No
Minnesota County Lands and Parks Departments	Minnesota Counties	Receive training on the Emergency Location Markers (ELM) system. Place and maintain ELMs at strategic locations on county trails, parks, forests, and waterways. Incorporate project provided educational materials into public outreach efforts.	No
Tribal Lands Departments	Minnesota Tribes	Receive training on the Emergency Location Markers (ELM) system. Place and maintain ELMs at strategic locations on tribal trails, parks, forests, and waterways. Incorporate project provided educational materials into public outreach efforts.	No
Recreational User Groups	Non-profit Recreational User Groups across Minnesota	Outdoor associations such as snowmobile, bicycle, hiking, hunting, and watercraft groups receive training on the Emergency Location Marker (ELM) system. Where appropriate, place and maintain ELMs at strategic locations in areas of responsibility in coordination with the trail land owners. Incorporate project provided educational materials into outreach efforts.	No
Emergency Services Sector: Wildland Search & Rescue teams, Conservation Officers, Law Enforcement, EMS, Firefighters, Emergency Managers	Minnesota First Responders	Receive training on the Geo-referencing chapter of the National Search and Rescue Committee's "Land Search and Rescue Addendum to the National Search and Rescue Manual," FEMA directive 092-5 "Use of the United States National Grid (USNG)," and how Emergency Location Markers connect to this national standards ecosystem for emergency geo-location.	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?

As has been the case where pilot ELM projects have been initiated in Minnesota - such as Lake, Dakota and Cook Counties - demonstration of utility has led local governments to fund project expansion. In one out of state case, Cobb County Georgia has committed over $300,000 to its effort. Thus, it is envisioned the ENRTF grant will be "seed" money which accelerates ELM adoption and expansion across Minnesota. As these additional pilot projects take hold, a critical mass will be achieved which will bring on additional installs funded through other federal, state, local and club sources.

Project Manager and Organization Qualifications

Project Manager Name: Stephen Swazee

Job Title: Executive Director

Provide description of the project manager's qualifications to manage the proposed project.
Steve Swazee is retired Navy Captain and former Delta Air Lines 747 pilot who has chaired the Emergency Preparedness Committee (EPC) of the Minnesota Geospatial Advisory Council since 2008. He was also previously a member of the Minnesota Geospatial Advisory Council and Geospatial Information and Technology Association (GITA) Board of Directors. During Hurricanes Katrina, Ophelia, Rita and Wilma in 2005, he was recalled to active duty to serve as the senior Department of Defense (DoD) Emergency Preparedness Liaison Officer at the Pentagon. He was subsequently a by-name appointment to the DHS-DoD post-Katrina data work group charged with developing a national Common Operating Picture that can be used by all levels of responders and decision makers. He is a graduate of the Naval Post-Graduate School of Aviation Safety, and while on active duty was the Director of Safety and Standardization of the U.S. Marine Corps' largest Air Group. His expansive experience in the Emergency Services Sector led him to help found St. Paul based SharedGeo, a nonprofit well known for its innovative mapping products which are typically released into the public domain. He has served as that organization's Executive Director since 2008, and in 2010 was awarded a Governor's Commendation for his service to the state as chair of the EPC.

Specific to Emergency Location Markers:
- Created and built the national center of excellence for information on the U.S. National Grid (USNG), the U. S. National Grid Information Center (www.usngcenter.org)
- Conceived the ELM concept, and developed technical standards which led to formal creation of the ELM
- Managed development of ELM production standards and procedures now used by commercial vendors
- Created an ELM web store with all proceeds going to support additional ELM research, development and install projects (www.usngstore.org)

Organization: SharedGeo

Organization Description:
SharedGeo is a federally recognized 501 (c) 3 nonprofit founded in September 2008 with the mission to help government, nonprofit, education, and corporate entities use mapping technologies and share geographic data for the public good. SharedGeo's initial focus was on disaster response and relief operations in the United States, but it has since become engaged in a wide variety of related activities – including environmental, public safety and specialized software development. Many of its employees donate their time – which allows SharedGeo to keep expenses low and use incoming revenues to develop additional products which benefit the public. Some of its current and past clients include the nation's largest professional geospatial association focused on infrastructure, Geospatial Information & Technology Association (www.gita.org), U.S. Fish and Wildlife Service, Iowa Department Homeland Security and Emergency Management, Minnesota Department of Transportation, and Airborne Data Systems (www.airbornedatasystems.com). It is home to one of the world's 21 software programs sanctioned by the Open Source Geospatial Foundation (OSGeo), GeoMOOSE (www.geomoose.com), which since 2008 has been used by hundreds of units of government around the world to share their geospatial data with the public for free.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Steve Swazee		Project Manager/Installation Coordinator			7.1%	0.5		$30,000
Bob Basques		Technical Support			7.1%	0.2		$15,000
Nancy Read		Contract Manager			7.1%	0.1		$6,000
							Sub Total	**$51,000**
Contracts and Services								
USNG/ELM Instructors	Professional or Technical Service Contract	Instructors will be individually contracted via respective Project Assignments to provide high quality, task specific training throughout the project cycle. It is anticipated all instructor personnel who will be used are currently known to SharedGeo and have been previously vetted for their expertise on subject matter.				1.2		$80,000
							Sub Total	**$80,000**
Equipment, Tools, and Supplies								
	Tools and Supplies	2000 Emergency Location Marker Signs at $25/sign delivered, $50,000 total.	Manufacture and shipping of ELM signs					$50,000
							Sub Total	**$50,000**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								

	Miles/ Meals/ Lodging	USNG ELM workshops and installation support visits by employees	Workshops on USNG, Emergency Location Markers and installation procedures					$5,000
							Sub Total	**$5,000**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
	Printing	Brochures describing ELM system - 50,000 copies total (5,000/10 projects)	Project specific outreach to the public to help them understand how to use the ELM system					$6,000
	Printing	First Responder training support handouts/materials - 1,000 packets/$4.00	Take away information packet given to attendees of instructional sessions					$4,000
							Sub Total	**$10,000**
Other Expenses								
		Art support	Graphic designer in support of public information and first responder printed items. $1,000 allocated to public information brochures, $1,000 allocated to training support items.					$2,000
							Sub Total	**$2,000**
							Grand Total	**$198,000**

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	Existing State, County and Tribal sign infrastructure installation and repair programs.	State, County and Tribal land managers will contribute their time and tools to install ELM signs at their designated locations. This may be done as part of their on-going sign installation and repair programs.	Potential	$50,000
			State Sub Total	**$50,000**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**$50,000**

Attachments

Required Attachments

Visual Component

File: 98a5984c-116.pdf

Alternate Text for Visual Component

Attachment is a PDF poster which walks through the story of how Minnesota's Emergency Location Marker (ELM) system come into existence and is now spreading across the nation. Designed to print at 4'x6', it opens at 26% size and needs to be adjusted up to read properly on a computer monitor. Highlights: (1) "What" is an ELM, (2) "Why" ELMs are needed, (3) Where ELMs can be found graphic, (4) ELM system creation steps, and (5) Examples of ELM styles, support products and project awards....

Financial Capacity

File: cd0762ef-b65.pdf

Board Resolution or Letter

Title	File
SharedGeo BOD Project Support Letter	5d25b9f7-aeb.pdf

Optional Attachments

Support Letter or Other

Title	File
Eight ELM Proposal Letters of Support	b05586a5-6a6.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?

Yes, SharedGeo

U.S. National Grid Speeds Emergency Response

Emergency Location Marker (ELM) Trail System

Steve Swazee and Nancy Read, SharedGeo

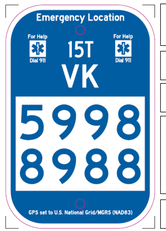
What

Problem

- 34% of U.S. response calls go to a location without a street address – recreational trails are a leading category
- Trails with location signs typically employ an approach which is unique to that park or trail system
- Locally unique marking systems have **NO VALUE** to responders unless those locations are **READILY AVAILABLE** in dispatch and response systems

Solution

- Develop a standardized Emergency Location Marker (ELM) which can be used anywhere in the nation in a variety of scenarios
- Align the marking system with established federal and state cartographic and signage standards
- Ensure the format leverages GPS instead of requiring constant updating of Computer Aided Dispatch systems
- Use a consistent approach which over time will become instantly recognizable by the public
- Involve multiple stakeholders during development to ensure a "Best Practices" outcome



Responder "Star of Life" symbol avoids Red Cross proprietary issue

15T - UTM Grid Zone; 4x6 degrees

VK - USNG/MGRS 100 KM Square

8 USNG digits called into a 911 response center provide 33' accuracy within an area of approximately 3,861 square miles.

Federal standard - Traffic Control Blue

Design Development Partners

- MGAC Emergency Preparedness Committee
- Minnesota Department of Transportation
- Minnesota Department of Natural Resources
- Lake County Minnesota focus group (law, trail riders, etc.)
- National focus group of responders and geospatial experts

Why

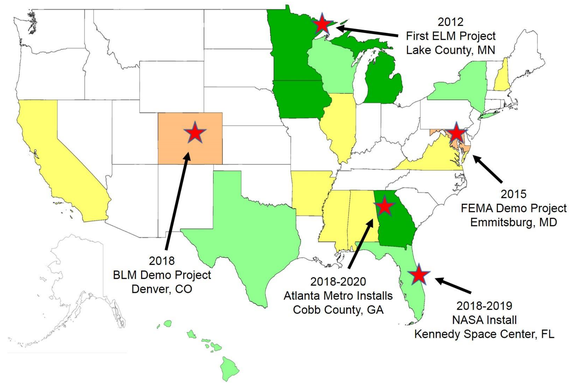
U.S. National Grid?

- USNG is the U.S. portion of the Military Grid Reference System (MGRS) – a well-established worldwide metric coordinate standard used by NATO and the U.S. Armed Forces since the late 1940's
- In November 2011, the seven federal agencies which comprise the National Search and Rescue Committee, designated USNG as the standard for ALL ground based Search and Rescue (SAR) operations in the U.S.
- In October 2015, FEMA designated USNG as its primary coordinate system and encouraged all partner organizations to do the same – USNG effectively became the nation's "Emergency Response Language of Location"

But What About…

- **Latitude/Longitude?**
  - It's base 60 math and nonstandard sized trapezoids are not conducive to responders understanding local location relationships
  - 13 digits are needed to get the same precision as an 8 digit USNG coordinate
  - Format confusion has sent responses to the wrong location with deadly results (DD.MM.SS, DD.MM.mm, or DD.dddd)
- **Cell Phone Location Reporting?**
  - There are many instances where tower triangulation doesn't work
  - In spring 2018, numerous major news organizations reported on significant location inaccuracies inherent in cell phones and the substantial problems caused for 911 centers
- **Next Gen 9-1-1 (NG911) Systems**?
  - Nationwide adoption of NG911 has been slow and spotty, and likely many rural areas where recreational trails are located remain decades away from implementing
  - USNG interoperability is a federal mandated data design standard of NG911 systems.
  - USNG and associated ELMs are meant to augment and not replace other sanctioned emergency response location reporting approaches such street addresses

One Minnesota ELM Trail System Becomes Many



USNG Emergency Location Marker Projects

- Four or more major installs
- One to three major installs
- Demonstration projects
- ELM Interest / USNG Inquiries

As of September 2019

SharedGeo

www.sharedgeo.org

SharedGeo is a 501(c)3 nonprofit with a mission to help government, nonprofit, education and corporate entities use mapping technologies and share geographic data for the public good.

How

A Truly Collaborative Geospatial Project Which Saves Lives!

1. **Build your team**
   - Emergency Manager
   - Responders (Law, Fire, EMS, SAR)
   - 911 Call Center (PSAP)
   - County/city administration
   - GIS support
   - Federal, state, local and private land owners
   - Trail user groups
2. **Plan system**
   - Average system density factors
     - » Rural = 1 ELM per mile
     - » Urban = 1 ELM per ¼ mile
   - Average ELM *delivered* budgeting factors
     - » Standard ELM - $30/ea
     - » Info signs - $35/ea (see next panel)
     - » Carsonite vertical style - $55/ea (see next panel)
   - Posts and hardware (use existing posts or need new?)
3. **Obtain funding**
   - Federal and state trail safety/improvement programs
   - Corporate safety grants
   - Trail user group fund raisers
   - Local government funding
4. **Accurately record planned ELM locations**
   - Trail heads
   - Road crossings
   - Known accident locations
   - Trail junctions
   - Camping areas or rest stops
5. **Order ELMs, info signs and hardware**
6. **Conduct responder and call center training**
7. **Install signs and practice responses**
8. **Publicize effort to ensure public knows how to use**

More

ELM Sizes and Styles

- Originally released in three sizes (6x9, 9x12, 12x12) on .063 aluminum to conform to various trail marking regulations, additional versions and supplemental signs now include:

Vertical Style ELMs

ELM Information Signs

3x5" Custom ELM Stickers

ELM Apps

SharedGeo's usngapp.org

Make an ELM Online usngmarker.org

Esri's MyUSNG

ELM Quick Notes

- ***"ELMs cut our trail response times by 90%"***, Pete Walsh, Finland, MN Fire Chief
- St. Paul, MN installed ELMs in Lilydale Regional Park after responders were unable to quickly locate a deadly accident in 2013
- The ELM project in Cobb County, GA was cited as a reason the county won the state's top IT Award in 2019
- ELM YouTube videos: "USNG emergency location markers Youtube"

USNG Learning:

www.usngcenter.org