



Environment and Natural Resources Trust Fund

2021 Request for Proposal

General Information

Proposal ID: 2021-225

Proposal Title: Eyes Over Minnesota'S Natural Resources

Project Manager Information

Name: Brian Huberty

Organization: SharedGeo

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Project Basic Information

Project Summary: Form the Minnesota Remote Sensing Coalition (MNRSC) to create a long-term, decadal plan to acquire, access, distribute aerial and satellite imagery for coordinated natural resource management and monitoring.

Funds Requested: \$119,000

Proposed Project Completion: 2023-06-30

LCCMR Funding Category: Small Projects (H)

Secondary Category: Foundational Natural Resource Data and Information (A)

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.

For nearly 100 years, Minnesota has acquired and used aerial imagery to assess, manage, map and monitor natural resources. Earth Day's recent 50th anniversary also triggered the start of using satellite imagery to observe Minnesota and the planet. However, there has never been a long term, comprehensive, state strategy on how best to acquire imagery. Given the increasing rate of change of our natural resources, it is prudent to come up with a plan, developed by a coalition of experts across the state, for systematic planned acquisitions in collaboration with the federal government. In 2019, the White House created the 2nd edition of the National Plan for Civil Earth Observations. Success in advancing the collection, use, and application of Earth observations will depend, in large part, on the U.S. Government's ability to "leverage new and creative partnerships and collaborative frameworks". This multi-sector enterprise consists of Federal agencies; State, local, and tribal governments; world-leading colleges and universities; private industries; non-profit organizations. Additionally, 'licensed' remote sensing imagery is becoming the new standard where MNRSC will need to rethink how to best share and access imagery with the academics, researchers, businesses, government agencies and the public.

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.

As stated in the 2021 LCCMR RFP: "Coordination, facilitation, or training pertaining to statewide sharing, distribution, or innovative application of natural resource data...and other remote sensing techniques". SharedGeo will help form the Minnesota Remote Sensing Coalition (MNRSC) to 1) create a decadal "Eyes Over Minnesota's Natural Resources" plan which will define future aerial and satellite imagery collections across Minnesota; 2) demonstrate cloud computing opportunities to create a statewide cloud sharing library system to allow access, storage, analysis and distribution of digital aerospace imagery .

Specific tasks are:

- 1) publish the first "Eyes Over Minnesota's Natural Resources Plan"
- 2) investigate a cloud sharing library system to allow access, storage, analysis and distribution of digital aerospace imagery
- 3) conduct surveys and workshops to gather continued stakeholder input.

Additional remote sensing collaboration will be supplied through the American Society for Photogrammetry and Remote Sensing, Western Great Lakes Region (ASPRS WGL), which represents the government, business and academic sectors.

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?

- 1) MNRSC will continue to analyze and recommend remote sensing systems for Minnesota's Natural Resources.
- 2) Improved federal remote sensing programs collaboration to help share the burden and improve management and monitoring of Minnesota's natural resources.
- 3) Improve the measurement, modelling, mapping, inventory, and monitoring of Minnesota's natural resources more rapidly over time through a collaboration library of remote sensing resources.

Activities and Milestones

Activity 1: Remote Sensing Workshops

Activity Budget: \$31,000

Activity Description:

SharedGeo will hold virtual and in-person workshops around the state to survey imagery needs, demonstrate cloud solutions with users.

These workshops may be hosted by the University of Minnesota, ASPRS workshops and annual meetings or Minnesota GIS/LIS workshops and annual meetings.

Activity Milestones:

| Description | Completion Date |
|---|-----------------|
| Conduct workshops around the state (3 at a minimum) | 2023-06-30 |

Activity 2: Eyes Over Minnesota's Natural Resources Plan Development

Activity Budget: \$40,000

Activity Description:

Plan write-up by collaboration members

Communication of requirements and collaboration with the federal government

Activity Milestones:

| Description | Completion Date |
|---|-----------------|
| Task chapter write-ups by applications, platforms and sensors | 2021-09-30 |
| Review first draft - Eyes Over Minnesota's Natural Resource | 2022-06-30 |
| Publish final draft | 2022-11-30 |
| Meet with federal agencies to coordinate plans | 2023-06-30 |

Activity 3: Cloud based image access, processing storage demonstration for natural resource applications

Activity Budget: \$40,000

Activity Description:

The cloud is becoming the central 'virtual' location for hosting public and licensed remote sensing imagery. Users of imagery are shifting from downloading silos of data to sharing data on the cloud. Entwine.usgs.io is an example where LIDAR data is stored, accessed and served for the nation overseen by USGS on Amazon Web Services. SharedGeo will follow this model to work with MNIT, MNDNR, MnGeo and other coalition members to demonstrate the cloud system. This demonstration will help determine future costs to administer future access and image data applications with cloud service providers such as Amazon Web Services and Google for natural resource applications.

Activity Milestones:

| Description | Completion Date |
|---|-----------------|
| Host cloud sharing workshops across the state for natural resource stakeholders. | 2023-06-30 |
| Demonstrate remote sensing image cloud approaches for natural resource applications | 2023-06-30 |

Activity 4: MNRSC Quarterly virtual and in-person meetings

Activity Budget: \$8,000

Activity Description:

Quarterly virtual and in-person meetings

Activity Milestones:

| Description | Completion Date |
|--|-----------------|
| Quarterly MNRSC virtual and in-person meetings | 2023-06-30 |

Project Partners and Collaborators

| Name | Organization | Role | Receiving Funds |
|-----------------------|---|---|-----------------|
| Brandon Krumwiede | ASPRS WGL & Great Lakes Remote Sensing Network | Professional - American Society for Photogrammetry and Remote Sensing - Western Great Lakes President Great Lakes Remote Sensing NOAA | No |
| Dr. Jennifer Corcoran | MN DNR Resource Assessment | State Government - Natural Resources Sector | No |
| David Fuhr | Airborne Data Systems | Airborne Camera Systems Manufacturer and Agriculture Sector | No |
| Paul Morin | University of Minnesota - Polar Geospatial Center | National Science Foundation - Remote Sensing Science Polar and Earth DEM | No |
| Adam Smith | Minnesota Department of Natural Resources | Transportation Sector | No |
| Michelle Carroll | SC-Recon | Unmanned Aerial Systems Mapping - Business Sector | No |
| Dan Ross | MnGeo | State Government - MNGEO | No |
| Miles Strain | Quantum Spatial | Mapping Engineering Sector Optical and Lidar image acquisition and processing | No |
| Tom Hollenhorst | EPA | Federal Government - EPA and Great Lakes Remote Sensing | No |
| Dr. Joe Knight | University of Minnesota - Remote Sensing and Geospatial Analysis Laboratory | University of Minnesota - Remote Sensing Science | No |
| Lisa Hanni | Goodhue County | County Government - Surveying | No |
| Dr. Nancy Read | Metropolitan Mosquito Control District | Entomology Science | No |
| Mark Korver | Amazon Web Services | Open Source Public Data Cloud Sector Remote sensing imagery cloud storage, analysis and distribution for public and private sectors. | No |
| Gerry Sjervin | Allete - Minnesota Power | Public Utilities | No |
| Howard Butler | Land Rush | Open Source Digital Cloud Structure and formulation guidance based on experience creating for USGS ENTWINE system - nationwide lidar cloud on AWS: usgs.entwine.io | Yes |
| Will Bartsch | University of Minnesota NRRRI | Minnesota Natural Resource Atlas | No |

| | | | |
|-------------------|---|---|----|
| Ryan Mattke | University of Minnesota, Borchert Map Librarian | University of Minnesota Map Library - Archive Long term library archive for all of Minnesota's aerial and satellite imagery as well as derived products. | No |
| Len Kne | University of Minnesota U-Spatial | University of Minnesota - U-Spatial Geospatial data training, serving and archiving | No |
| Allison Slaats | MN.IT @ MnGEO | MN.IT MnGeo's Data Coordination Leader | No |
| Dr. Ben Richason | St. Cloud State University | Minnesota State Universities - Remote Sensing Science | No |
| Dr. Leif Olmanson | University of Minnesota - Waters | University of Minnesota - Water Science Remote Sensing Minnesota Lakes water quality monitoring. | No |
| Dr. Jim Hipple | USDA Risk Management Association | Cropland monitoring | No |
| Greg Stensaas | USGS Eros Data Center | Federal Government - Aerial and Satellite Systems | No |
| Carl Sack | Fond Du Lac Tribal and Community College | Native American GIS program instructor | 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?

Recommendations from the plan and cloud demonstrations will drive future requirements. The recommendations gathered during this project will be transmitted to academic, industry and government leaders with supporting media (websites, documents, etc.) to help plan and formulate actions for future years. This includes recommendations for acquiring aerial and satellite imagery as well as cloud access, storage, analysis and distribution approaches. USGS Requirements, Capabilities & Analysis for Earth Observation program may fund future state programs.

Project Manager and Organization Qualifications

Project Manager Name: Brian Huberty

Job Title: Remote Sensing Project Manager

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

Office of Science & Technology Policy - 2019 National Plan for Civil Earth Observations

Ag & Forestry Chapter Lead

Federal Assessment Working Group – 2nd Earth Observation Assessment

2016 & 2018 Federal Satellite Needs Working Group - FWS Leader

Professional Certification: American Society for Photogrammetry & Remote Sensing - ASPRS - Remote Sensing Mapping Scientist #RS130

Professional Leadership:

American Society for Photogrammetry & Remote Sensing (ASPRS)

Director - Primary Data Acquisition Division

President- Western Great Lakes Region

2011 ASPRS Annual Conference Co-Chair

2002-2012 Professional Digital Aerial Mapping Camera Systems Workshop Instructor

1997 First North American Symposium on Small Format Aerial Photography Co-Chair

Int'l Society for Photogrammetry & Remote Sensing – Airborne Sensors Working Group Chair
Experience:

Aerial Photographer, Minnesota Dept of Natural Resources, Resource Assessment

Inventory Forester, Minnesota Dept of Natural Resources, Resource Assessment

Instructor, USDA Forest Service, National Remote Sensing Program

Midwest GIS Leader, USDA Natural Resources Conservation Service

National Remote Sensing Leader, U.S. Fish & Wildlife Service

Organization: SharedGeo

Organization Description:

Sharedgeo formed the umgeocon.org collaboration conferences in 2016 and 2018 to forge cross-state collaboration for the GIS, surveying and remote sensing communities. SharedGeo was founded as a 501 c3 non-profit in September 2008 as a way to advance the use of mapping technologies and share geographic data in support of environmental disaster response and relief operations in the United States. Since 2008, SharedGeo has expanded its geospatial support roles in a wide variety of applications including: producing higher accuracy COVID-19 maps for the U.S. (<https://www.sharedgeo.org/COVID-19/>); establishing the U.S. National Grid Center (<https://usngcenter.org/>), and the supporting the Great Lakes Restoration Initiative for the U.S. Fish & Wildlife Service (<https://www.sharedgeo.org/portfolio-item/glri/>).

Budget Summary

| Category / Name | Subcategory or Type | Description | Purpose | Gen. Ineligible | % Benefits | # FTE | Classified Staff? | \$ Amount |
|---------------------------------------|--|--|---|-----------------|------------|-------|-------------------|-----------------|
| Personnel | | | | | | | | |
| Brian Huberty | | Project Manager and Plan Editor | | | 20% | 0.6 | | \$40,000 |
| Jim Klassen | | High Performance Cloud Computing | | | 20% | 0.5 | | \$30,000 |
| Steve Swazee | | Administration | | | 20% | 0.2 | | \$7,000 |
| | | | | | | | Sub Total | \$77,000 |
| Contracts and Services | | | | | | | | |
| Landrush LCC | Professional or Technical Service Contract | Digital cloud image consulting similar to what created the USGS LIDAR Entwine cloud: https://usgs.entwine.io | | | | 0.2 | | \$10,000 |
| | | | | | | | Sub Total | \$10,000 |
| Equipment, Tools, and Supplies | | | | | | | | |
| | Tools and Supplies | Cloud hosting demonstration | Remote sensing data cloud hosting storage, analysis, and distribution | | | | | \$21,000 |
| | | | | | | | Sub Total | \$21,000 |
| Capital Expenditures | | | | | | | | |
| | | | | | | | Sub Total | - |
| Acquisitions and Stewardship | | | | | | | | |
| | | | | | | | Sub Total | - |
| Travel In Minnesota | | | | | | | | |
| | Miles/ Meals/ Lodging | Statewide plan and digital cloud workshops | Workshops write up the plan and to train users on using the digital cloud | | | | | \$5,000 |

5/22/2020

| | | | | | | | | |
|---------------------------------|-----------------------|--|---|---|--|--|--------------------|------------------|
| | | | | | | | Sub Total | \$5,000 |
| Travel Outside Minnesota | | | | | | | | |
| | Miles/ Meals/ Lodging | Meetings with Federal Remote Sensing Programs | Leverage and collaborate with federal remote sensing programs | X | | | | \$5,000 |
| | | | | | | | Sub Total | \$5,000 |
| Printing and Publication | | | | | | | | |
| | Publication | Eyes On Minnesota Natural Resources | State plan for observing Minnesota's natural resources | | | | | \$500 |
| | Publication | website distribution of Eye's On Minnesota's Natural Resources | website support to distribute publication | | | | | \$500 |
| | | | | | | | Sub Total | \$1,000 |
| Other Expenses | | | | | | | | |
| | | | | | | | Sub Total | - |
| | | | | | | | Grand Total | \$119,000 |

Classified Staff or Generally Ineligible Expenses

| Category/Name | Subcategory or Type | Description | Justification Ineligible Expense or Classified Staff Request |
|--------------------------|---------------------|---|--|
| Travel Outside Minnesota | Miles/Meals/Lodging | Meetings with Federal Remote Sensing Programs | Travel to Washington DC expenses |

Non ENRTF Funds

| Category | Specific Source | Use | Status | Amount |
|------------------|--|--|----------------------------|------------------|
| State | | | | |
| | | | State Sub Total | - |
| Non-State | | | | |
| In-Kind | AWS Non-profit, Education, Research and Development Credits programs. | AWS Cloud Credits for Research for example supports research and development for accredited institutions. Researchers that apply for this program take an initiative to build a cloud-hosted service, software, or tools to migrate a research and development process and/or open data to the cloud. The credit amount awarded will vary depending on the cost model and usage requirements documented in the proposal. | Pending | \$30,000 |
| In-Kind | Google Cloud Public Datasets - Google Earth Engine | Contributed remote sensing data for further public analysis using Google Earth Engine. Wildfire analysis through Google Cloud Public (GCP) dataset. | Pending | \$30,000 |
| In-Kind | Microsoft Azure Open Datasets | Satellite Imagery open to the public | Pending | \$10,000 |
| In-Kind | USGS Requirements Capabilities & Analysis for Earth Observations (RCA-EO) https://www.usgs.gov/land-resources/nli/rca-eo NASA Federal Satellite Needs Working Group (SNWG) https://earthdata.nasa.gov/esds/impact/snwg | USGS is planning to contribute their time, approaches and expertise to help guide MNRSC to develop the Eyes Over Minnesota's Natural Resources plan based on previous work for the federal Government-RCA-EO and SNWG. | Pending | \$120,000 |
| | | | Non State Sub Total | \$190,000 |
| | | | Funds Total | \$190,000 |

Attachments

Required Attachments

Visual Component

File: [4cbda32b-eb4.pdf](#)

Alternate Text for Visual Component

White House 2019 National Plan for Civil Observations

Financial Capacity

File: [c890ad23-ec5.pdf](#)

Board Resolution or Letter

| Title | File |
|--|----------------------------------|
| SharedGeo Board of Directors Approval Letter | aea8f9ec-e34.pdf |

Optional Attachments

Support Letter or Other

| Title | File |
|--|----------------------------------|
| Support Letter Dr Jennifer Corcoran MN DNR | 97e24a5c-db8.a |
| Support Letter Brandon Krumwiede ASPRS WGL | 200ef395-746.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



2019 NATIONAL PLAN FOR CIVIL EARTH OBSERVATIONS

A Report by the
U.S. Group on Earth Observations Subcommittee
Committee on the Environment

of the
NATIONAL SCIENCE & TECHNOLOGY COUNCIL

December 2019

