Project Title: Accelerated Aggregate Resource Mapping

Category: A. Foundational Natural Resource Data and Information

Name: Heather Arends

Sponsoring Organization: MN DNR

Title: Mineral Potential Section Manager

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Web Address https://www.dnr.state.mn.us/

Location
Region: Southwest

County Name: Chippewa, Kandiyohi, Lyon, Redwood, Sibley, Swift, Yellow Medicine

City / Township:

Alternate Text for Visual:
Status of DNR Aggregate Resource Mapping Program. Two counties are in progress, thirteen counties have requested mapping, and 46 counties need aggregate resources information.

<table>
<thead>
<tr>
<th>Funding Priorities</th>
<th>Multiple Benefits</th>
<th>Outcomes</th>
<th>Knowledge Base</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Extent of Impact</td>
<td>Innovation</td>
<td>Scientific/Tech Basis</td>
<td>Urgency</td>
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<tr>
<td>Capacity</td>
<td>Readiness</td>
<td>Leverage</td>
<td>TOTAL</td>
</tr>
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If under $200,000, waive presentation?
PROJECT TITLE: Accelerated Aggregate Resource Mapping

I. PROJECT STATEMENT
The Aggregate Resource Mapping Program (ARMP) proposes to 1) identify and characterize aggregate resources in seven counties; 2) survey the location and status of reclamation of all gravel pits within each county 3) create geospatial information and databases at a scale of 1:100,000 4) provide technical support to counties regarding how to incorporate aggregate resources in planning, permitting, and reclamation; 5) disseminate data and maps to county staff, elected officials, and the public through on-line web mapping service: (https://www.dnr.state.mn.us/lands_minerals/aggregate_maps/online_maps/index.html). The seven counties include Kandiyohi, Swift, Chippewa, Yellow Medicine, Lyon, Redwood, and Sibley.

Aggregate resources are needed to maintain and repair critical and aging infrastructure. In rural areas, upwards of 90% of aggregates are paid with public tax money. While aggregate demand is associated with urbanization, rural areas are responsible for the largest network of roads. Rural areas are also confronted with unique issues that significantly impact access to and availability of aggregates, such as natural scarcity of high quality aggregates. Without locally available aggregates, the distance to transport aggregates directly increases the cost of publically funded projects and the carbon footprint of construction projects. Knowing the location of all sources of aggregate as well as their quality is needed by local land use planners and elected officials to make informed decisions. For this reason, the Minnesota Association of County Planners and Zoning Administrators (MACPZA) supports the funding of aggregate mapping in their 2018 Legislative platform. In addition, the final recommendations of the 2017 Aggregate Resources Task Force Final Report supports funding for accelerated mapping of aggregate resources with the goal of completing the state in 10 years.

The Department of Natural Resources (DNR) is directed to map aggregate resources under MN Statute §84.94. Aggregate resource mapping is a cooperative effort between the DNR and the Minnesota Geologic Survey as well as the Minnesota Department of Transportation (Mn/DOT). Every effort is made to collaborate with these agencies, as well as local governments, to inform the data, interpretations, and final products generated by the DNR.

II. PROJECT ACTIVITIES AND OUTCOMES
Activity 1: Data compilation and reconnaissance level field work
Geologists will compile all available and relevant gravel pit data, historic geologic maps, and reports. GIS personnel will compile available digital data. Four DNR project geologists will start mapping and field work.
ENRTF BUDGET: $273,500

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Historic digital data is compiled for 5 counties (two counties compilations are complete)</td>
<td>December 2019</td>
</tr>
<tr>
<td>2. Complete survey of gravel pits</td>
<td>September 2020</td>
</tr>
</tbody>
</table>

Activity 2: Conduct sampling for seven counties
Four geologists will conduct geologic fieldwork to collect samples and observations on aggregate deposits and landforms. This project will consist of 2-3 field seasons (depending on size of the county) and a field review. Supervisor will coordinate staff and equipment for field seasons. Geologist will survey gravel pits, collect geologic field observations, identify aggregate bearing landforms. Aggregate deposits will be explored and
confirmed with 80 to 150 drill holes per county and analyzed in laboratory. Assistants will help with fieldwork and delivering samples to MNDOT Aggregate Materials Laboratory.

**ENRTF BUDGET: $677,500**

<table>
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<th>Outcome</th>
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<tr>
<td>1. Drill and sample locations to characterize the quantity and quality of aggregate</td>
<td>September 2020</td>
</tr>
<tr>
<td>2. Ground-truth aggregate potential models and interpretations</td>
<td>September 2020</td>
</tr>
<tr>
<td>3. Process samples at the Hibbing sediment laboratory</td>
<td>January 2021</td>
</tr>
</tbody>
</table>

**Activity 3: Create Map and Digital Products**

During off seasons for field work, geologists will analyze the new data and the historic data. Geologists, with the assistance of GIS staff, will delineate and catalogue aggregate resource potential, identify aggregate resource trends, and produce draft aggregate maps. Draft maps will undergo a review process as well as be open for public comment. Supervisor will provide technical assistance to geologist; oversee project standardizations between counties; and relay project status updates to Counties.

**ENRTF BUDGET: $318,811**

<table>
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<tr>
<th>Outcome</th>
<th>Completion Date</th>
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<tbody>
<tr>
<td>1. Field data processed and entered into DNR’s information systems.</td>
<td>June 2021</td>
</tr>
<tr>
<td>2. Digital maps (GIS polygon data) created for aggregate resource potential, compiled sampling results (sieve analysis, deleterious lithology, and soundness)</td>
<td>June 2021</td>
</tr>
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**Activity 4: Delivering survey results**

Provide interpretation of results from Activities 1 through 3 and deliver the final products and technical assistance to local governments.

**ENRTF BUDGET: $111,168**

<table>
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<th>Outcome</th>
<th>Completion Date</th>
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</thead>
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<tr>
<td>1. Provide workshops to counties, townships, and municipalities.</td>
<td>June 30, 2021</td>
</tr>
<tr>
<td>2. Final draft of maps and GIS products are available on DNR website.</td>
<td>June 30, 2021</td>
</tr>
</tbody>
</table>

III. PROJECT PARTNERS:

A. Partners receiving ENRTF funding  NA

B. Partners NOT receiving ENRTF funding  NA

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:

ARMP information, data, and technical guidance have proven critical to local governments and the state. Currently ARMP is unfunded and is looking to the legislature to provide long-term sustainable funding until the state’s aggregate resources are fully mapped. This priority reflects the recommendations coming from the 2017 Aggregate Resource Task Force Final Report.

V. TIME LINE REQUIREMENTS:

ARMP will complete the mapping of seven counties specified within this report and meet the objectives in Activities 1-4 by June 30, 2021.
### BUDGET ITEM | AMOUNT
---|---
**Personnel:**
- Geologist (4 unclassified - 4 FTE for 2 years) $520,000
- Program Supervisor (1 classified - 1 FTE for 2 years) $170,000
- GIS/Cartographer (1 classified - 1 FTE for 2 years) $115,000
- 1 Student Worker (1 unclassified - 0.75 FTE for 2 years) $40,000
- Field Technician (1 classified - 1 FTE for 2 years) $90,000

**Professional/Technical/Service Contracts:**
- MN.IT service level agreements TBD $20,000
- **Sample Analysis:** Minnesota Department of Transportation - Material Laboratory. Submit samples to MN/DOT to be analyzed for fin and course gradations, lithologic testing, sulphate magnesium, flat and/or elongated particles, and other test deemed necessary. $200,500

**Equipment/Tools/Supplies:**
- Equipment is used from previous survey periods when at all possible (e.g. GPS units, drilling equipment, augers, cameras, communication/safety equipment, etc.) but replaced, repaired, or updated as necessary. Items such as batteries, sample bags, field notebooks, and hand held augers. $30,000

**Travel:** Travel expenses for MN travel related to field survey in Activities 1 & 2. Travel expenses are subject to State of MN labor agreements and DNR policy. Most travel expenses are related to the 4-6 months of time when staff are conducting field work that requires food, transportation in seasonal DNR fleet vehicles, and lodging. $100,000

**Direct and Necessary:** DNR’s direct and necessary costs pay for activities that are directly related to and necessary for accomplishing appropriated projects. HR Support (~$22,901), Safety Support (~$4,744), Financial Support (~$13,657), Communication Support (~$1,251), IT Support (~$51,867), and Planning Support (~$1,059). $95,479

**TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =** $1,380,979

### V. OTHER FUNDS

| General Fund FY18 |
|---|---|
| General Fund FY19 - there is currently a bill submitted to support general fund dollars for aggregate resource mapping - 450,000 for the first year and 950,000 until 2028. | $450,000.00 | Pending |

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2019 Proposal Budget Spreadsheet

**Project Title:** Accelerated Aggregate Resource Mapping

**IV. TOTAL ENRTF REQUEST BUDGET 2 years**

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Map Updated January, 2018
Minnesota Department of Natural Resources, Division of Lands and Minerals, Director Jess Richards

Completed and In Progress
SHERBURN 1987
WRIGHT 1990
ISANTI 1992
CLAY 1997
BLUE EARTH 1999
NICOLLET 2000
CHISAGO* 2001
BENTON 2002
DODGE 2002
LE SUEUR 2003
RENVILLE 2003
ITASCA* 2004
MEEKER* 2006
MILLE LACS* 2008
CARLTON* 2009
FOND DU LAC 2009
RESERVATION* 2010
OLMSTED 2010
Cu+Ni PROJECT* 2010
STEARS 2011
KANABEC 2012
AITKIN 2014

Completed Counties
19

In Progress
2

Requested through County Board Resolution
46

Requested by County Board Resolution
2

Remember to check the completed and in progress map for any updates.
Project Manager Qualifications and Organization Description

Project Manager: Heather Arends
Affiliation: Department of Natural Resources, Division of Lands and Minerals
Telephone Number: 651-259-5376
Title: Mineral Potential Section Manager

Experience

Heather Arends has worked for the Department of Natural Resources for 20 years. She currently manages the Mineral Potential Section, which is responsible for managing the states 12 million acre mineral interests. Her previous responsibilities included supervising the Aggregate Resource Mapping Program where she oversaw the successful completion of half of the counties mapped by the DNR. She received a B.A. in Geological Science from the University of Minnesota, Morris and is currently working on completing M.S. in Geological Sciences from the University of Minnesota, Duluth.

Organization Description

The mission of the Minnesota DNR is to work with citizens to conserve and manage the state’s natural resources, to provide outdoor recreation opportunities, and to provide for the commercial uses of natural resources in a way that creates a sustainable quality of life.

The Division of Lands and Minerals works to provide exceptional real estate and mineral expertise to enhance Minnesota’s future, uphold strong environmental protections and support our economy by demonstrating the highest professional standards.