Federal Performance Report (NR223A750025C013-PE-SA1-24)

(For viewing only)

1. Federal Agency and Organizational Element to Which Report is Submitted
USDA NRCS

2. Federal Grant or Other Identifying Number Assigned by Federal Agency
NR223A750025C013

3a. UEI Number
KABJZBBJ4B54

3b. EIN (Data is Masked)

4. Recipient Organization (Name and complete address including Zip code)

Name
REGENTS OF THE UNIVERSITY OF MINNES OTA

Number & Street	City	State	Zip
200 OAK STREET SE	MINNEAPOLIS	MN	55455-2070

5. Recipient Identifying Number or Account Number:
CON000000099099

6. Project/Grant Period (Month, Day, Year)

Start Date:
9/27/22

End Date:
9/30/24

7. Reporting Period (Month, Day, Year)

End Date:
3/27/24

8. Final Report?
No

9. Report Frequency:
Semi-Annual

10. Performance Narrative: (Attach performance narrative as instructed by the awarding Federal Agency on the Attachments tab)
The Alaska Soil Data Bank (AKSDB) project has made significant progress since its inception in October 2022. The project aims to

consolidate non-NRCS soil and soil-adjacent legacy data for the state of Alaska onto a single data platform, the University of Minnesota Supercomputing Institute's (MSI) Genetic, Environmental, Management and Socioecological (GEMS), to facilitate digital soil mapping initiatives.

Key accomplishments include:

1. Acquisition and curation of diverse datasets: The project team has acquired and curated data from various sources, including academic institutions (University of Alaska Fairbanks, University of Minnesota, Woods Hole Research Center), government agencies (National Park Service Arctic Research Coordination Network, U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory, Bureau of Land Management), and private entities (Alaska Biological Research). Notable acquisitions during the reporting period include Jim Bockheim's northern Alaska pedon database (~500 pedons), data from the Copper River Basin and Yukon Delta (~100 pedons), and 1,700+ pedons from private datasets. The USFS has also shared legacy datasets (20+ pedons) and descriptive scans (8,000+). Geotechnical borehole data focusing on permafrost and ground ice has been integrated. As of March 2024, the total number of non-duplicated data points nears 8,000, with many not previously included in existing databases.

2. Development of metadata tagging and harmonization workflow: The project team has developed a system for tagging raw datasets with hierarchical metadata codes to enable harmonization. Functions have been created to search and pull data based on metadata tags, allowing flexible output table creation. Crosswalks are being developed between project codes and NCSS, WoSIS, and ISCN.

3. Collaboration and data sharing: The project team has made the GitHub repository public to facilitate sharing links and collaboration. Non-disclosure agreements and data sharing agreements are being finalized with private entities. Data management documentation has been shared, and a Box folder has been set up for secure data transfer.

4. Planning for covariates and modeling: Discussions have been held regarding the resolution of covariates for modeling, with a decision to generate terrain derivative covariates at 10-meter resolution using resampled, harmonized IFSAR data. A comprehensive list of covariates, including terrain derivatives, imagery, and other data sources, will be compiled and shared with the group. Options for hosting and distributing covariate scripts and data are being explored.

5. Reporting and outreach: The project team has presented updates and progress reports at monthly meetings, with recordings and minutes made available. A presentation was given to the Earth Science Information Partners (ESIP) Soil Informatics Cluster, leading to potential connections with other projects facing similar challenges.

The project is on track to deliver the Alaska Soil Data Bank, a statewide 30m predictive digital soil class map, and a digital soil map of Katmai National Park and Preserve by the extended project end date (NCE) of September 2025. Ongoing efforts focus on finalizing data acquisition, refining harmonization workflows, generating covariates, and planning for modeling and analysis.

Comparison of Accomplishments with Milestones and Deliverables:

According to the original project proposal, the Alaska Soil Data Bank (AKSDB) project aimed to achieve three main deliverables:

1. The Alaska Soil Data Bank (AKSDB): A scalable harmonization approach using controlled vocabularies and field metadata.
2. A 30m Alaska state-wide digital soil class map (Soil order and suborder).
3. An innovative raster-based, delineated soil map by segmentation analysis for Katmai National Park and Preserve.

Based on the meeting minutes and project updates, significant progress has been made towards achieving these deliverables, although some milestones have been adjusted due to the project's extended timeline.

Deliverable 1: The Alaska Soil Data Bank (AKSDB)
- Milestone: Data acquisition, centralization, and ingestion (Year 1, Quarters 1-4, ongoing)
- Accomplishment: Extensive data acquisition efforts have been undertaken, with diverse datasets acquired from academic, government, and private sources. The current total count of non-duplicated data points nears 8,000, with many not previously

included in existing databases. Data centralization and ingestion are ongoing, with a focus on finalizing data sharing agreements and secure data transfer.

- Milestone: Data quality enhancement and harmonization (Year 1, Quarters 3-4; Year 2, Quarters 1-2, ongoing)
- Accomplishment: A metadata tagging and harmonization workflow has been developed, allowing for flexible output table creation based on metadata tags. Crosswalks are being developed between project codes and NCSS, WoSIS, and ISCN. Data quality enhancement efforts are ongoing.

- Milestone: Data export and interoperability with other databases (Year 2, Quarters 1-2, ongoing)
- Accomplishment: Discussions have been held regarding data export and integration with NASIS. The project team is working on providing a data table structure file and metadata for the NASIS snapshot. Full accomplishment of this milestone is expected by the end of Year 2.

Deliverable 2: Statewide 30m Predictive Digital Soil Mapping Product
- Milestone: Covariate curation and script development (Year 1, Quarters 3-4, ongoing)
- Accomplishment: Discussions have been held regarding the resolution of covariates for modeling, with a decision to generate terrain derivative covariates at 10-meter resolution using resampled, harmonized IFSAR data. A comprehensive list of covariates is being compiled and will be shared with the group.

- Milestone: Predictive model runs (Year 2, Quarters 1-2, projected Year 3)
- Accomplishment: Predictive modeling efforts are expected to commence once the covariate curation and script development are complete. The extended project timeline allows for this milestone to be achieved by the end of Year 3 (NCE).

Deliverable 3: Digital Soil Mapping Product for Katmai National Park and Preserve
- Milestone: Segmentation analysis (Year 1, Quarters 3-4, projected Year 3)
- Accomplishment: Progress has been made in acquiring and preparing training data for Katmai National Park and Preserve. The segmentation analysis is expected to be completed by the end of Year 3 (NCE).

- Milestone: Predictive model runs and segment classification (Year 2, Quarters 1-2, projected Year 3)
- Accomplishment: Predictive modeling and segment classification for Katmai National Park and Preserve are expected to be carried out in Year 3 (NCE).

In summary, the project has made substantial progress towards achieving its deliverables, with ongoing efforts focused on finalizing data acquisition, refining harmonization workflows, generating covariates, and planning for modeling and analysis. The extended project timeline (NCE), with a new end date of September 2025, allows for the completion of remaining milestones and deliverables. No significant deviations from the original deliverables are anticipated, and the project team remains committed to achieving the stated objectives.

11. Other Attachments (Attach other documents as needed or as instructed by the awarding Federal Agency on the Attachments tab)

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12. Certification: I certify to the best of my knowledge and belief that this report is correct and complete for performance of activities for the purposes set forth in the Federal Award documents.

a. Typed or Printed Name and Title of Authorized Certifying Official

N/A

b. Signature of Authorized Certifying Official

N/A

c. Telephone (Area code, number and extension)

N/A

d. Email Address

N/A

e. Date Report Submitted (Month, Day, Year)

N/A

13. Agency Use Only:

Signature

Select a Certifying Official by typing their name into the appropriate field. As you type, a list of matching names will appear below the field (you may need to press the down arrow on your keyboard to display the list). Click the appropriate Certifying Official's name when it appears on the list of matches. Please note that the user must be registered in ezFedGrants. You can select yourself as the Certifying Official.

A Primary Certifying Official must be selected. The Secondary Certifying Official is optional. Notifications and work items will be sent to each Certifying Official selected here.

Primary Certifying Official

N/A

Attachments

Title	Operator	Date/Time
No attachments		

Comments

Comment	Commented By	Date/Time
No items		