Final Abstract

Final Report Approved on September 24, 2025

M.L. 2022 Project Abstract

For the Period Ending June 30, 2025

Project Title: ESTEP: Earth Science Teacher Education Project

Project Manager: Lee Schmitt

Affiliation: Minnesota Science Teachers Association

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Website: https://www.mnsta.org/

Funding Source:

Fiscal Year:

Legal Citation: M.L. 2022, Chp. 94, Sec. 2, Subd. 05f

Appropriation Amount: $495,000

Amount Spent: $444,435

Amount Remaining: $50,565

Sound bite of Project Outcomes and Results

ESTEP has reinvigorated environmental education in Minnesota schools serving 605 teachers from 64 different Minnesota counties (74%) through 13 summer institutes and 19 online courses. Pre/post data show participants increased their earth/environmental content knowledge, time devoted to Minnesota-focused environmental topics, confidence in teaching environmental science, and outdoor learning.

Overall Project Outcome and Results

The Earth Science Teachers Education Project (ESTEP) was designed to meet the needs of Minnesota teachers of science in implementing the new Minnesota Science Standards while also invigorating environmental education in Minnesota schools. Environmentally-focused summer programs and online courses were provided for Minnesota science teachers.

Overall ESTEP engaged a total of 605 teachers from 64 different Minnesota counties (74% of all counties) – 248 participating in 13 hands-on, environmentally-focused summer institutes and 357 in 19 topic-focused online courses.

To determine meeting of project goals, a teacher survey instrument was administered before attending an ESTEP

summer program. Teachers were then re-surveyed in February of the next year after five months of teaching to the new standards with an emphasis on Minnesota's air, water, land and minerals. Pre/post data analysis measured the impact of ESTEP programs on teaching and on the earth/environmental curricula in Minnesota schools.

Each summer program also administered pre/post content tests to gauge teacher gains in understanding of material related to the science standards.

Analysis of data matched to project outcomes show:

1) ESTEP increased teacher content knowledge. Based on averaging all pre/post test scores, teachers' content understanding improved 48%.

2) ESTEP increased teacher skills in three-dimensional instruction. Comfort with 3D instruction showed an average 250% increase over three years and the use of specific 3D strategies had a three-year average increase of 113%.

3-4) ESTEP increased curriculum time and confidence in teaching environmental topics. The average of all environmental-related survey statements showed a three-year average increase of 67% while using Minnesota resources as the context for lessons rose an average of 96% over three years!

5) ESTEP increased outdoor learning experiences for Minnesota students. Frequency of using the outdoors as a classroom showed a three-year average increase of 145%.

ESTEP has achieved its promised goals.

Project Results Use and Dissemination

The Minnesota Science Teachers Association (MnSTA) has used ENRTF funding to emphasize LCCMR's efforts toward protecting Minnesota's environmental resources. MnSTA displays the LCCMR logo and required verbiage on its website www.mnsta.org and in all conference presentations, PowerPoints, newsletters and other communications. This will continue even after the ESTEP grants. ENRTF funding also will have a permanent place of recognition in the MnSTA ESTEP Online Repository at the end of ESTEP 2.0.

MnSTA will continue to spread the news of how ENRTF funds have supported implementation of the new state science standards and enriched environmental education statewide.

Environment and Natural Resources Trust Fund

M.L. 2022 Approved Final Report

General Information

Date: December 22, 2025

ID Number: 2022-169

Staff Lead: Tiffany Schaufler

Project Title: ESTEP: Earth Science Teacher Education Project

Project Budget: $495,000

Project Manager Information

Name: Lee Schmitt

Organization: Minnesota Science Teachers Association

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Project Reporting

Final Report Approved: September 24, 2025

Reporting Status: Project Completed

Date of Last Action: September 24, 2025

Project Completion: June 30, 2025

Legal Information

Legal Citation: M.L. 2022, Chp. 94, Sec. 2, Subd. 05f

Appropriation Language: $495,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with the Minnesota Science Teachers Association to provide professional development for Minnesota science teachers in environmental and earth science to strengthen environmental education in schools.

Appropriation End Date: June 30, 2025

Narrative

Project Summary: The Earth Science Teacher Education Project (ESTEP) will provide statewide professional development for Minnesota science teachers in Environmental and Earth Science content and pedagogy to strengthen environmental education in schools.

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

With adoption of the new 2019 Minnesota Academic Standards in Science, all 6th grade teachers in Minnesota will now be asked to teach earth/environmental science to their students using a new phenomenon-based approach to instruction. Sixth-grade teachers are being asked to teach science subject matter in which most have little or no background. In addition, high schools will need to develop and implement new earth/environmental science courses. These high school teachers of science, especially in rural districts, will need accessible, affordable graduate-level earth/environmental science courses to procure a 9-12 Earth and Space Science teaching license.

All the quality work and successes of LCCMR-funded programs will have little longevity if we do not develop and maintain a citizenry educated in the richness, value and fragility of Minnesota's natural resources. Now is the opportune time for a statewide initiative to prioritize and strengthen environmental education in all our schools. Environmental education in Minnesota needs stimulus, focus and rejuvenation; teachers need earth/environmental science training; and the implementation of the new 2019 science standards provides the impetus.

ESTEP will meet this challenge and enhance environmental education in schools throughout Minnesota.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

Solving this urgent need for statewide professional development in Environmental and Earth Sciences for Minnesota teachers requires an experienced team of educators and scientists. Organized and led by MnSTA, geologists from MSU-Moorhead, Mankato, St. Cloud, Winona and UM-Twin Cites will team with experienced environmental/earth science educators to provide 13 ESTEP Institutes over three summers (2022-2024) in four different regions of the state, serving up to 310 Minnesota 6th grade and high school science teachers. Five content-focused online courses offered during the same timeframe can serve another 960 teachers, together serving up to 1270 teachers and enriching earth/environmental education for an estimated 60,000 Minnesota students.

Institutes will include review of key environmental/earth science concepts addressed in the standards; the new phenomenon-based approach to teaching science; lab and fieldwork; sharing resources; and collegial planning for classroom implementation.

Understanding the detail and complexity of Earth's systems is crucial to the future of our economy and our planet, and having teachers knowledgeable and confident in Earth and Environmental Science topics is essential for quality earth/environmental education.

ESTEP will create a statewide emphasis in environment education in 6th grade and high school earth science classrooms across Minnesota.

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?

We cannot protect what we do not understand. Preserving Minnesota's natural resources cannot be accomplished without fundamental knowledge of geology, hydrology and climate taught in our schools by informed, confident science educators.

To improve the quality of earth/environmental education, ESTEP will:
1) Increase teacher content knowledge in environmental/earth sciences with direct emphasis on Minnesota's water, air, land, minerals, and climate.
2) Increase teacher skills in designing and facilitating phenomenon-based instruction.
3) Increase curriculum time devoted to environmental science and student-directed investigations.
4) Increase teacher confidence and enthusiasm for teaching environmental science.
5) Increase outdoor learning experiences.

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

Activities and Milestones

Activity 1: ESTEP Planning and Coordination

Activity Budget: $2,000

Activity Description:
Objective: Design and market three teacher institutes for July/August 2022, the summers of 2023-24, and five online courses.

MnSTA and our five university partners have been discussing elements of the ESTEP program for two years. With MnSTA funding, planning will move aggressively to set specific course content that directly targets new standards benchmarks, finalizing course syllabi, determining phenomenon-based teaching strategies to be modeled, designing pre/post tests and attitudinal surveys, choosing field sites, finalizing locations and dates, and detailing/confirming logistics for the institutes and online courses. These tasks will be divided and assigned to team members with strict deadlines.

Due to the urgent need for this professional development, the ESTEP Planning Team has agreed to complete planning and waive all expenses so institutes can begin in mid-July and August of 2022. $2000 has been budgeted for planning in years two and three.

Marketing during the 2021-22 school year will be done at no cost by MnSTA and MESTA through their listservs and webpages. District science leaders in all Minnesota schools will be contacted to direct market ESTEP to their science teachers. MnSTA will handle online registrations.

When funding becomes available on July 1, 2022, ESTEP will be ready.

Activity Milestones:

Description	Approximate Completion Date
Complete detailed agendas for summer institutes.	October 31, 2021
Locations/instructors determined/confirmed for one high school and two 6th grade institutes in July/August 2022.	November 30, 2021
Marketing and application designed, tested and posted online.	January 31, 2022
Online course syllabi completed and reviewed. Online platforms ready.	March 31, 2022
Logistics and participants confirmed.	May 31, 2022
Planning Team meets after each summer for a day of program review and revisions.	December 31, 2024

Activity 2: Fulfillment of ESTEP Professional Development Summer Institutes and Fall/Spring Online Courses

Activity Budget: $484,000

Activity Description:
Objective: Deliver 13 high-quality, environmentally-focused summer professional development institutes and up to 30 fall/spring online courses over three years.

In July 2022, 20 high school science teachers will attend a 5-day institute at MSU-Moorhead, July 25-29, while two, 5-day 6th grade teacher institutes, serving 30 teachers each, will run in the Metro, July 18-22, and Alexandria, August 8-12.

Beginning in fall 2022 though spring 2025, five online courses – Earth Essentials, EE/ES Advanced Topics, Geoscience for Elementary Teachers, Meteorology, and Astronomy – will be available each semester for up to 960 teacher participants.

In summer 2023, two high school institutes will be provided at MSU-Moorhead and MSU-Mankato, and ESTEP will also host three 6th grade institutes (30 participants each) in three different regions of the state. Tentative 2023 sites include the Metro, Marshall, and Duluth.

In summer 2024, two high school institutes will be provided at MSU-Moorhead and MSU-Mankato, and ESTEP will host three 6th grade institutes in three regions. Locations and dates TBD.

ESTEP will serve as many as 340 teachers in 13 programs in summers 2022-24 and up to 960 teachers in online courses.

Activity Milestones:

Description	Approximate Completion Date
Complete three, first-year regional summer programs for up to 80 teachers of science.	August 31, 2022
Complete five regional summer programs for up to 130 teachers.	August 31, 2023
Complete five regional summer programs for up to 130 teachers.	August 31, 2024
Complete 24 online sections, serving 40 teachers each, during the falls and springs of 2022-25.	May 31, 2025

Activity 3: Evaluation and Reporting on ESTEP Impact on Environmental Education in Minnesota Schools

Activity Budget: $9,000

Activity Description:
Objective: Collect data from ESTEP participants and their students to determine the effectiveness of the program and its impact on earth/environmental education in Minnesota.

Instruments below will be developed using non-ENTRF funds from MnSTA planning grants and will comply with ENTRF funding requirements.

Teacher Tests: Standards-based evaluative instruments will be developed to gauge teacher learning of earth/environmental concepts. Pre/post institute score analysis will determine the number that show statistically significant (t test) knowledge gains.

Teacher Surveys: This will be a project-specific, Likert-type instrument to assess changes in attitude and classroom practice to be completed by teachers online pre-program and again at the end of the following school year. Items will be compared pre versus post to determine percentage changes in responses related to confidence in teaching science/environmental topics, amount of instructional time devoted to environmental and phenomenon-based teaching, and areas of professional growth.

Student Tests: Project-developed student knowledge and skills tests will be constructed. Achievement in earth/environmental content will be gauged by comparing scores of the teacher participants' students to students of teachers who teach the same standards and grade level but did not participate in ESTEP.

Activity Milestones:

Description	Approximate Completion Date
Construct and test ESTEP Teacher Survey instruments.	July 31, 2022
Complete the design of content tests and rubrics for gauging teacher and student learning.	July 31, 2022
Administer online survey instrument to teachers registered for summer 2022 institutes.	July 31, 2022

Collect data on student engagement and learning of environmental science during school year.	May 31, 2023
Administer online survey again to teachers after one year of teaching post-ESTEP training.	May 31, 2023
Analyze/report findings on teacher/student achievement and classroom advances in Minnesota earth/environmental education.	June 30, 2023
Repeat data collecting, analysis and reporting for 2023 and 2024 programs.	August 31, 2024

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Dr. Russell Colson, Professor of Geology	Minnesota State University, Moorhead	Dr. Colson will serve as lead instructor for two cohorts of 20 high school science teachers seeking additional licensure in 9-12 Earth/Environmental Science. Colson will lead four, 8-day summer institutes at MSU-Moorhead, present at regional institutes, and instruct two online courses over the three years of the project.	Yes
Dr. Bryce Hoppie, P.G. (Mn), Professor of Geology	Minnesota State University, Mankato	Dr. Hoppie will be the lead earth/environmental science instructor for three, 5-day, regional 6th grade science teacher summer institutes and lead one cohort of high school teachers hosted at MSU-Mankato.	Yes
Dr. Kate S. Pound, Geology Professor	St. Cloud State University	Dr. Pound will be the lead earth/environmental science instructor for three, 5-day, 6th grade science teacher summer institutes hosted at St. Cloud State, Bemidji State, and UM-Crookston.	Yes
Dr. Jennifer L.B. Anderson, Professor of Geoscience	Winona State University	Dr. Anderson will serve as a guest presenter on Minnesota climate issues for all ESTEP summer institutes.	Yes
Dr. Hillary A. Barron, Research Associate	University of Minnesota Twin Cities	Dr. Barron will be a guest presenter in teaching toward equity in science/environmental education at all summer institutes.	Yes
Dr. Rachel Humphrey, Professor	St. Cloud State University	Dr. Humphrey will instruct the online introductory Meteorology course for teachers offering up to two sections in fall and spring over the three years of the project.	Yes
Larry Mascotti, Community Faculty	Metropolitan State University	Mr. Masotti will instruct the online introductory Astronomy course for teachers offering up to two sections in fall and spring over the three years of the project.	Yes
Kate Rosok, MESTA President	Minnesota Earth Science Teachers Association (MESTA)	MESTA - a statewide organization serving Minnesota earth science teachers - will provide co-instructors for each ESTEP summer institute, help with statewide coordination, identify regional field sites, and provide teaching resources and networking for ESTEP participants.	No
Dr. Donna Whitney	School of Earth and Environmental Sciences; University of Minnesota Twin Cities	Dr. Whitney will serve as a guest presenter focusing on Minnesota minerals, geo-habitats and petrology for all summer institutes.	Yes

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.
The ultimate goal of ESTEP is to provide teacher professional development in earth/environmental sciences that will become curricula in Minnesota schools to instruct and inspire students on the value, protection and conservation of Minnesota's natural resources. Environmental studies in 6th grade and high school science classes will be taught by newly-knowledgeable, motivated and confident science educators. Data from ESTEP summer and online programs, resources and teaching strategies will be shared statewide through MnSTA conferences, workshops, website and newsletters. Other educational organizations will be tapped to spread the news of how Minnesota ENRTF funds have

supported the new state science standards, eased the transition for science teachers, and enriched environmental education statewide. ENRTF Acknowledgment Guidelines will be followed by using the LCCMR logo and required verbiage on all project communications and outreach.

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 work be funded?

The ultimate result of ESTEP will be a cohort of science teachers confident in their content understanding and pedagogical skills in addressing the new Earth/Environmental Science standards. Implementation of a more vibrant, environmentally - and Minnesota-focused approach - to teaching science will be immediate in classrooms across the state.

Pre/post testing of teachers and students plus pre/post attitudinal surveys will be used to gauge the success of ESTEP.

Resources and strategies will be distributed statewide through MnSTA conferences, workshops and website. All expenses in maintaining communication and sharing best practices and resources will be funded by MnSTA.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount	$ Amount Spent	$ Amount Remaining
Personnel										
							Sub Total	-	-	-
Contracts and Services										
Dr. Russell Colson	Subaward	Dr. Colson will be lead instructor for one cohort of high school teachers totaling 16 days of instruction at $800 per day (NSF PhD daily rate) plus instruct six online courses at $3000 per course. (Normal reimbursement would be $9348.) $400 is also budgeted for planning team work.				0.84		$24,700	$24,000	$700
Dr. Bryce Hoppie	Subaward	Dr. Hoppie will serve as lead instructor for 6th grade and high school institutes totaling 38 days over three years. The $800/day stipend matches NSF grant guidelines for PhD instructors and includes all preparation, course instruction, assessment, mileage, and per diem. $400 is also budgeted for planning team work.				0.54		$24,600	$24,600	-
Dr. Kate Pound	Subaward	Dr. Pound will serve as lead instructor for three 6th grade teacher summer institutes. The $800/day stipend is based on NSF grant guidelines for PhD instructors and includes all preparation, course instruction, assessment, mileage, and per diem. $400 is also budgeted for planning team work.				0.06		$16,500	$13,305	$3,195
Dr. Rachel Humphrey	Subaward	Ms. Humphrey will instruct three online courses in Meteorology, one per year, over three years. The instructor rate of $3000 per online course is based on one-third of the standard university rate for teaching a three-				0.39		$13,000	$12,000	$1,000

		credit online course for up to 40 students.								
Larry Mascotti	Subaward	Mr. Mascotti will instruct three online courses in Astronomy, one per year, over three years. The instructor rate of $3000 per online course is based on one-third of the standard university rate for teaching a three-credit online course for up to 40 students.				0.39		$9,000	$9,000	-
Dr. Jennifer Anderson	Subaward	Dr. Anderson will present on Minnesota climate for one-half day for 11 programs over three years. $400 is one-half of the $800 per day afforded PhD instructors based on NSF grant guidelines and includes all preparation, presentation, mileage, and per diem.				0.15		$9,500	$5,200	$4,300
Dana Smith	Subaward	Ms. Smith will co-instruct for two, 8-day. $400 per day is based on NSF grant guidelines for non-PhD instructors and is inclusive of all expenses. She will also guest present on environmental topics for five institutes and co-teach one online class. $400 is also budgeted for planning team work.				0.6		$22,000	$21,610	$390
Marlene Schoeneck	Subaward	Ms. Schoeneck, a high school science teacher, will guest present for one day in each of 11 programs focusing on environmental education and pedagogy. $400 per day is based on NSF grant guidelines for non-PhD instructors and includes all preparation, presentation, mileage, and per diem.				0.6		$21,000	$14,450	$6,550
Mary Ann Colson	Subaward	Ms. Colson, a middle school science teacher, will co-instruct with Dr. Colson at MSU-Moorhead for two, 8-day programs focusing on environmental education and pedagogy. $400 per day is based on NSF grant guidelines for non-PhD instructors and includes all				0.12		$10,400	$8,100	$2,300

		expenses. She will also guest present five days at other institutes.								
John Olson	Subaward	Mr. Olson will manage the ESTEP budget and be responsible for all budget-related transactions. $3000 per year is based on an estimated 200 hours per year at $15/hour.				0.3		$9,000	$9,000	-
Lee Schmitt	Subaward	Mr. Schmitt will manage project evaluation and reporting. $3000 per year is based on an estimated 200 hours per year at $15/hour. $400 is budgeted for planning team work. Schmitt will also co-instruct for 1.5 days in each of 11 summer programs at $400 per day.				0.3		$13,000	$12,620	$380
High School Teacher Co-instructors TBD	Subaward	Experienced high school earth/environmental teachers will be selected to co-teach each of the eight 6th grade summer institutes to highlight teaching strategies. An estimated 28.5 days at $400 per day is based on NSF grant guidelines for non-PhD instructors and includes all preparation, presentation, mileage, and per diem.				0.51		$15,700	$14,920	$780
MSU-Moorhead	Subaward	Course credit for high school teacher participants. Amount is based on 30% of 40 possible teachers in the high school program choosing to receive credits vs stipend. $120/credit is a negotiated fee from MSU-Moorhead (see justification). 12-credit licensure preparation program x $120/credit x 12 participants.		X		0		$32,420	$27,730	$4,690
MSU-Moorhead	Subaward	Course credit for 6th grade teacher participants. Amount is based on 40% of 270 possible teachers in the nine, 5-day summer programs choosing to receive credits vs stipend. $120/credit is a negotiated fee from MSU-Moorhead (see justification).		X		0		$30,780	$23,190	$7,590

		2 credits x $120/credit x 108 participants.								
MSU-Moorhead	Subaward	Online course credit for teachers. Amount is based on 50% of a possible 960 teachers that could participate in ESTEP online courses if every section were filled (highly unlikely). $120/credit is a negotiated fee from MSU-Moorhead (see justification). 3 credits x $120/credit x 480 teachers.		X		0		$186,800	$171,360	$15,440
							Sub Total	**$438,400**	**$391,085**	**$47,315**
Equipment, Tools, and Supplies										
	Tools and Supplies	Field Notebooks for Teachers (310 teachers x $21.95)	Recording data and notes from field and lab investigations plus essential geo-scales and information for processing soil, mineral and rock data in the field.					$5,981	$5,981	-
	Tools and Supplies	Field lens. (310 teachers x $13.50)	Essential tool for magnification in the field.					$3,363	$3,363	-
	Tools and Supplies	MGS County Atlases (310 teachers x $12.50)	Detailed geologic maps of each teacher's county including bedrock, habitats, water and mineral resources.					$3,053	$3,053	-
	Tools and Supplies	Assorted MGS Geology/Hydrology Maps of Minnesota (310 teachers x $25)	Observation and investigation of Minnesota soils, water, habitats, and mineral resources.					$5,928	$5,928	-
	Tools and Supplies	General field/lab supplies TBD based on final curricula in each region. Supply amount is based on MSU-recommended $125/student for instructional supplies in a science class.	Tools, lab equipment, chemicals needed for field and lab investigations TBD.					$3,675	$3,675	-
							Sub Total	**$22,000**	**$22,000**	**-**
Capital Expenditures										
							Sub Total	**-**	**-**	**-**

Acquisitions and Stewardship										
							Sub Total	-	-	-
Travel In Minnesota										
							Sub Total	-	-	-
Travel Outside Minnesota										
							Sub Total	-	-	-
Printing and Publication										
	Printing	Duplicating of handouts and maps	Printouts will be needed for teachers to use in processing data, gaining insight into lesson design, and to highlight pertinent earth/environmental science content.					$2,600	$1,770	$830
							Sub Total	**$2,600**	**$1,770**	**$830**
Other Expenses										
		Stipends for High School Teacher Participants	Amount based on 75% of 40 possible teachers in the high school program choosing to receive a stipend vs credits. $60/day for attending professional development is 33% of the average teacher stipend rate of $180/day. 8 days x $60/day x 2 summers x 30 teachers.	X				$18,200	$16,080	$2,120
		Stipends for 6th grade Teacher Participants	Amount based on 60% of 270 possible teachers in the 6th grade program choosing to receive a stipend vs credits. $60/day for attending professional development is	X				$13,800	$13,500	$300

			33% of the average teacher stipend rate of $180/day. 5 days x $60/day x 162 teachers.							
							Sub Total	**$32,000**	**$29,580**	**$2,420**
							Grand Total	**$495,000**	**$444,435**	**$50,565**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Contracts and Services - MSU-Moorhead	Subaward	Course credit for high school teacher participants. Amount is based on 30% of 40 possible teachers in the high school program choosing to receive credits vs stipend. $120/credit is a negotiated fee from MSU-Moorhead (see justification). 12-credit licensure preparation program x $120/credit x 12 participants.	Educational professional development grants typically fund a teacher credit or stipend option. MSP, ITQ, 3M, Medtronic, MDE and NSF grants all allow for payment of credits or stipend to teachers. Participation in ESTEP requires a large commitment of time, and teachers deserve some form of compensation. MnSTA has negotiated with Minnesota State University, Moorhead to provide a "co-sponsored rate" for graduate credits at $120 per credit. This pays for administration of the credit only (recording, posting grades, transcripts, etc.) and provides no "profit" or overhead for the university. MSU-Moorhead would normally charge $460/credit, so $120 is a real bargain not offered by any other university. Course credits will be consolidated and all payments for credits will be made to MSU-Moorhead.
Contracts and Services - MSU-Moorhead	Subaward	Course credit for 6th grade teacher participants. Amount is based on 40% of 270 possible teachers in the nine, 5-day summer programs choosing to receive credits vs stipend. $120/credit is a negotiated fee from MSU-Moorhead (see justification). 2 credits x $120/credit x 108 participants.	Educational professional development grants typically fund a teacher credit or stipend option. MSP, ITQ, 3M, Medtronic, MDE and NSF grants all allow for payment of credits or stipend to teachers. Participation in ESTEP requires a large commitment of time, and teachers deserve some form of compensation. MnSTA has negotiated with Minnesota State University, Moorhead to provide a "co-sponsored rate" for graduate credits at $120 per credit. This pays for administration of the credit only (recording, posting grades, transcripts, etc.) and provides no "profit" or overhead for the university. MSU-Moorhead would normally charge $460/credit, so $120 is a real bargain not offered by any other university. Course credits will be consolidated and all payments for credits will be made to MSU-Moorhead.
Contracts and Services - MSU-Moorhead	Subaward	Online course credit for teachers. Amount is based on 50% of a possible 960 teachers that could participate in ESTEP online courses if every section were filled (highly unlikely). $120/credit is a negotiated fee from MSU-Moorhead (see justification). 3 credits x $120/credit x 480 teachers.	Educational professional development grants typically fund a teacher credit or stipend option. MSP, ITQ, 3M, Medtronic, MDE and NSF grants all allow for payment of credits or stipend to teachers. Participation in ESTEP requires a large commitment of time, and teachers deserve some form of compensation. MnSTA has negotiated with Minnesota State University, Moorhead to provide a "co-sponsored rate" for graduate credits at $120 per credit. This pays for administration of the credit only (recording, posting grades, transcripts, etc.) and provides no "profit" or overhead for the university. MSU-Moorhead would normally charge $460/credit, so $120 is a real bargain not offered by any other university. Course credits will be consolidated and all payments for credits will be made to MSU-Moorhead.
Other Expenses		Stipends for High School Teacher Participants	Educational professional development grants typically fund a teacher credit or stipend option. MSP, ITQ, 3M, Medtronic, MDE and NSF grants all allow for payment of credits or stipend to teachers. Participation in ESTEP requires a large commitment of time, and teachers deserve some form of compensation. $60/day for attending professional

			development is 33% of the average teacher daily stipend rate of $180/day.
Other Expenses		Stipends for 6th grade Teacher Participants	Educational professional development grants typically fund a teacher credit or stipend option. MSP, ITQ, 3M, Medtronic, MDE and NSF grants all allow for payment of credits or stipend to teachers. Participation in ESTEP requires a large commitment of time, and teachers deserve some form of compensation. $60/day for attending professional development is 33% of the average teacher daily stipend rate of $180/day.

Non ENRTF Funds

Category	Specific Source	Use	Status	$ Amount	$ Amount Spent	$ Amount Remaining
State						
			State Sub Total	-	-	-
Non-State						
In-Kind	Summer Instructor and Presenter Travel	Instructors' summer mileage for travel to and from summer institute locations will be waived. (200 miles/year x .575/mile x 12 instructors/presenters x 3 years = $4140 in kind.)	Secured	$4,140	$4,100	$40
In-Kind	Participant Travel to Field Sites	Program bus/van mileage to transport teachers to field sites will be replaced by using teacher vehicles. (4 vehicles/summer x 300 miles/day x 0.58/mile x 21 days = $14,616 in kind.)	Secured	$14,616	$14,500	$116
In-Kind	Lead Instructor Planning Mileage	Mileage for Drs. Colson, Hoppie, and Pound to visit and select field sites for investigation will be waived. (300 miles x .575/mile x 4 instructors = $2,070 in kind.)	Secured	$2,070	$1,900	$170
In-Kind	Minnesota Universities and Schools	Rental fees for use of university facilities and school sites for summer institutes will be waived. (Estimated $500/week x 17 weeks = $8500 in program savings.)	Secured	$8,500	$6,500	$2,000
In-Kind	Minnesota Science Teachers Association (MnSTA)	A one-year membership in MnSTA/MESTA will be provided in kind for summer teacher participants. (310 participants x $25 = $7750 in kind.)	Secured	$7,750	$6,200	$1,550
In-Kind	Minnesota Science Teachers Association (MnSTA)	MnSTA website marketing, registration, and statewide online distribution of resources will be provided in kind. ($600/year x 3 years = $1800)	Secured	$1,800	$1,800	-
In-Kind	Minnesota Science Teachers Association (MnSTA)	The six-member ESTEP Lead Planning Team received two $10,000 planning grants from MnSTA. These non-ENRTF funds were used for planning and preparing online courses, summer teacher institutes and evaluation instruments all matching grant initiatives and LCCMR guidelines.	Secured	$20,000	$20,000	-
In-Kind	Minnesota School Districts	Minnesota school districts will be asked to reimburse teacher travel expenses to ESTEP summer institutes using their available ESSA funding. Room and board amount is based on 50% need for 6th grade teachers and 100% need for high school teachers staying in university dorms.	Potential	$42,320	$42,100	$220

			Non State Sub Total	**$101,196**	**$97,100**	**$4,096**
			Funds Total	**$101,196**	**$97,100**	**$4,096**

Attachments

Required Attachments

Visual Component

File: 10c1ea00-0b9.pdf

Alternate Text for Visual Component

The logo contains the letters ESTEP in an open format with graphics within each letter. The "E" contains a cross-section of a volcano, "S" contains an image of soil and rocks, "T" show a river system, "E" contains clouds and a tornado, and "P" a planet's surface starry skies....

Financial Capacity

File: 2f9e617e-b29.pdf

Board Resolution or Letter

Title	File
MnSTA Board Authorization for LCCMR Grant (ESTEP)	306e4e5f-000.pdf

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Intro & 2019 Minnesota Academic Standards in Science	ea247e7b-219.pdf
6th & 9-12 Minnesota Environmental Benchmarks (Highlighted)	f87fb8bf-c2e.pdf
ESTEP Background Check Form_2022-05-23 initialed	a7d22c46-35f.pdf
ESTEP Logo	1c5c572b-b85.pdf
ESTEP Summer Boot Camp Series	3ce19a39-dac.pdf
ESTEP High School Boot Camp Series	b6fe4c48-898.pdf
ESTEP Online Course Schedule	cc7551e2-42c.pdf
ESTEP Online Course Descriptions	50397538-45f.pdf
ESTEP 2022 Attendance Info	f6558f76-b2a.xlsx
ESTEP 2022 Pre-Post Data Analysis	66c57ead-6c6.xlsx
Winter MinSTA Newsletter with ESTEP Article on p.8	a5856824-4f7.pdf
Minnesota Educator ESTEP Article	b334808f-a80.pdf
ESTEP 2023-24 Attendance Info	27fb9dc3-95a.xlsx
ESTEP 2023 Pre-Post Data Analysis	171988a3-3da.xlsx
2023-2025 Revised ESTEP Bootcamp Schedule	612bd69b-b81.pdf
Spring 2023 MnSTA Newsletter - ESTEP pp.12-16	cb04e0c0-28c.pdf
GMS News February 2024 - ESTEP p.3-4	c34cf56d-88b.pdf
ESTEP in PD News	dba132ee-042.docx
ESTEP Participant Testimonials	d81e8feb-51b.pdf
Pre Post Test Results 2024	fe82bb90-6ee.xlsx
ESTEP 2.0 Announcement	f32bf760-0c8.docx
ESTEP 2024 Attendance Info	3b165182-2eb.xlsx
ESTEP 2024 Pre-post Data Analysis	6e04d4eb-7b9.xlsx
ESTEP 2024-25 Attendance Info	837391df-10d.xlsx
ESTEP 2024-25 Attendance Update	c8c76063-729.xlsx
ESTEP 2024-25 Pre-Post Data Analysis Update	d4fe7329-a4c.xlsx
ESTEP Total Attendance Numbers	452791a5-ac0.xlsx

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

First Round of Revisions:
1) Under "Organization Contact Information", the address and phone for MnSTA have changed, and I cannot make these changes. New address: 24405 Iceland Path, Lakeville, MN 55044. New phone: 612-801-1490. 2) End date changed to June 30, 2025. 3) Added Milestone #6 to Activity #1 addressing planning team work. 4) Added to Activity #3 Description that non-ENRTF funds were used to plan summer programs and prepare evaluation instruments in advance, at our own risk, using non-ENRTF, MnSTA planning grants. 5) In Budget for Professional Contracts, changed Joe Reymann (now deceased) to John Olson; changed budget amount for Lee Schmitt (who is now an instructor as well as evaluator) and reduced matching amount for high school teacher co-instructors; distributed planning team budget amount to individual team members; established MSU-Moorhead as the entity receiving all credit payments; and in non-ENRTF Contributions to Project added $10,000 to the MnSTA planning grant amount. 6) In Attachments, added a visual and moved the Environmental Benchmarks document to Other. 7) Added Dissemination Plan paragraph.

Second Round of Revisions, requested on June 8th and due by June 14th are as follows:

1) Again, the address and phone for MnSTA have changed, and I cannot make these changes (see #1 above). Please advise. 2) Comment #1: We are aware that all costs for any pre-planning before final approval of our proposal will be paid by MnSTA, not ENRTF funds. Wording in the Activity 1 description has been changed to reflect this. 3) Comment #2: To avoid any red flags, the three milestones dates in Activity 3 that were before ENRTF funding have been changed to July 31, 2022. This date is still accurate. 4) Comment #3: The ESTEP Logo, added as a visual, is the only "visual" we have for the project. The ? box says that we "may attach a map, photo", etc. So is providing a visual a requirement? If the ESTEP logo is not acceptable, we would prefer to not have a visual at all. Please advise. 5) Comment #4: Under Professional/Technical Contracts, Contract types have been changed to Sub Awards.

Please let me know if you have any added questions or concerns. Thank you for adding our initialed Background Check form to the Attachments.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

N/A

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

N/A

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

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

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

N/A

Work Plan Amendments

Amendment ID	Request Type	Changes made on the following pages	Explanation & justification for Amendment Request (word limit 75)	Date Submitted	Approved	Date of LCCMR Action
1	Amendment Request	• Budget - Professional / Technical Contracts • Budget - Capital, Equipment, Tools, and Supplies • Budget - Printing and Publication • Budget - Other • Attachments	Moving money from credits to stipends is a necessary adjustment based on how teachers have signed up for each. Far more teachers than expected are opting for stipend vs credit. We are requesting to move $34,200 from the MSU-Moorhead Credit Sub award to Stipends. Our Printing budget is almost gone. We are using online resources as much as possible, but printing is still necessary. We are requesting to move $4000 from Supplies to Printing.	February 27, 2023	Yes	March 20, 2023
2	Amendment Request	• Budget - Professional / Technical Contracts • Budget - Capital, Equipment, Tools, and Supplies • Budget - Non-ENRTF Funds Contributed	The ESTEP Project is requesting a shift in three budget lines under Profession and Technical Contracts. 1. Dr. Hillary Barron ($4400 to $2200) 2. Dr. Donna Whitney ($4400 to $2200) 3. Mary Ann Colson ($8400 to $12800) As the ESTEP Project evolves, some contractors are doing more teaching than others. We are asking to reduce two instructors by a total of $4400 and move these funds to Mary Colson who will surpass her budgeted amount.	September 8, 2023	Yes	September 8, 2023
3	Amendment Request	• Budget - Professional / Technical Contracts	The ESTEP Project is requesting a shift in four budget lines under Professional Contracts. 1. Donna Whitney is no longer with the project ($2200 to $0) 2. Hillary Barron has reduced her involvement ($2200 to $1200). 3. Marlene Schoeneck	January 4, 2024	Yes	February 1, 2024

			has added instructional time ($4400 to $7500). 4. High School Instructors increase by $500 ($11,400 to $11,900). ESTEP is adapting to teacher requests by adding online courses thereby shifting the amount of instructional time.			
4	Amendment Request	• Other • Budget - Professional / Technical Contracts • Activities and Milestones • Budget - Capital, Equipment, Tools, and Supplies • Budget - Printing and Publication • Budget - Other	The ESTEP Project is requesting a multi-line budget amendment. All changes in instructor stipends are based on who is teaching what until the end of the project in June 2025. Five instructor stipends go up; four go down. Credit amount goes up to cover increased enrollment in oneline courses. Added high school co-intructors requires an increase in that line. Teacher stipend lines, supplies and printing all go down now that summer institutes are completed.	October 29, 2024	Yes	October 30, 2024
5	Amendment Request	• Budget - Professional / Technical Contracts • Budget - Capital, Equipment, Tools, and Supplies • Budget - Printing and Publication • Budget - Other • Budget - Non-ENRTF Funds Contributed • Attachments	ESTEP is requesting $4000 be moved from the High School Co-instructor line to Rachel Humphrey. $3000 is for teaching an additional online course requested by teachers. The added $1000 is an original budgeting error where she was budgeted at $3000 for a five-day, in-person program which should have been $4000 (5 days @ $800/day). ESTEP also requests $3000 be moved from the High School Co-instructor line to Kate Pound for teaching an additional online course.	March 31, 2025	Yes	April 1, 2025

Status Update Reporting

Final Status Update August 14, 2025

Date Submitted: August 7, 2025

Date Approved: September 9, 2025

Overall Update
Over the last three years, the Earth Science Teachers Education Project (ESTEP) has run smoothly and met the urgent need of science teachers to learn the earth/environmental science content they need to address the new Minnesota Science Standards while emphasizing Minnesota resources and the protection of our environment as focal points of their curricula.

Since the March 2025 report, ESTEP has provided one more 5-day high school program in Astronomy at MSU-Winona, June 16-20, serving 29 teachers, and one online course, entitled "Earth Essentials 2", with 11 participants. (See "ESTEP 2024-25 Attendance Update" in Attachments.) ESTEP has served a total of 605 teachers of science from throughout the state – 248 participating in 13 challenging, hands-on, environmentally-focused summer institutes and 357 in 19 rigorous, topic-focused online courses.

Final data analysis provided in Activity 3 shows ESTEP has:
1) Increased teacher content knowledge in earth/environmental sciences with direct emphasis on Minnesota's water, air, land, minerals, and climate.
2) Increased teacher skills in designing and facilitating phenomenon-based instruction.
3) Increased curriculum time devoted to environmental science and student-directed investigations.
4) Increased teacher confidence and enthusiasm for teaching science.
5) Increased outdoor learning experiences for students.

ESTEP has achieved its promised outcomes.

Activity 1
All Activity 1 Milestones have been met. Planning of summer program agendas, logistics, marketing and online/bootcamp syllabi were completed in advance of each summer program and online course.

This final report includes pre/post content test results from the June 16-20 Winona astronomy program and the final number of teachers who participated in each program over the three years of ESTEP. (See "ESTEP 2024-25 Attendance Update" and "ESTEP Total Attendance Numbers" in Attachments.)
(This activity marked as complete as of this status update)

Activity 2
All Milestones in Activity 2 are completed as of June 30, 2025. Summer "bootcamps" in 2022 (three programs), 2023 (three programs), and 2024-25 (seven programs) have been completed serving 248 teachers. Online courses (19 total) have served 357 teachers from across the state. See "ESTEP 2024-25 Attendance Update" in Attachments for spring online course and Astronomy bootcamp attendees with names, districts and represented Minnesota counties.
(This activity marked as complete as of this status update)

Activity 3
All Milestones are completed. Milestones #6-7 are an analysis of teacher survey data collected before attending an ESTEP summer program and re-surveyed in February of the next year. Pre/post analysis measures the impact of ESTEP programs on teaching and earth/environmental curricula in Minnesota schools. (See "ESTEP 2024-25 Pre-Post Data

Analysis Update" in Attachments and "ESTEP 2023 Pre-Post Data Analysis".)

Analysis of data matched to project outcomes show:
1) Increase teacher content knowledge – all teachers pre/post test scores improved an average of 49% in 2024 programs. The three-year average gain in content knowledge is 48%.
2) Increase skills in 3D instruction – comfort with 3D instruction showed an 83% increase in 2024 and an average 250% increase over three years. The use of specific 3D strategies rose an average of 109% with a three-year average of 113%.
3-4) Increase curriculum time and confidence in environmental topics – average of all environmental-related statements rose 21%, with a three-year average of 67%. Using Minnesota resources as the context for lessons rose an average 96% in 2024 with an average of 96% over three years!
5) Increase outdoor learning – average increase of 97% in using the outdoors, with a three-year average of 145%.
(This activity marked as complete as of this status update)

Dissemination
All ESTEP-related webpages, PowerPoints, and papers used in instruction carry the LCCMR logo and required verbiage.

At the NSTA Conference in Minneapolis, November 12-15, 2025, ESTEP past participants and team leaders will present three sessions on the impact of ESTEP on Minnesota science education, including full exposure of the role of LCCMR/ENRTF funding in making this project happen.

Teacher comments regarding their ESTEP experience have been overwhelmingly positive. A sample of "ESTEP Teacher Testimonials" is provided in Attachments.

The MnSTA homepage displays an ESTEP banner at the upper right. Clicking on this banner sends teachers to ESTEP information and online registration. www.mnsta.org

ENRTF funding will have a permanent place of recognition in the MnSTA ESTEP Online Repository to be unveiled at the end of ESTEP 2.0 in 2027. Earth and Environmental Science resources and lessons supporting the new three dimensional/phenomenon/practices-based approach to teaching science will be available to all science teachers across Minnesota.

The ESTEP Team and MnSTA will continue to spread the news of how Minnesota ENRTF funds have supported implementation of the new state science standards, eased the transition for science teachers, and enriched environmental education statewide.

Status Update Reporting

Status Update March 1, 2025

Date Submitted: March 8, 2025

Date Approved: April 1, 2025

Overall Update
The Earth Science Teachers Education Project (ESTEP) is progressing on schedule, meeting the needs of earth/environmental science teachers, and reaching its project goals.

Since the September 2024 report, ESTEP has provided seven, well-received spring/fall online courses involving 94 teachers. To date, with completion of 12 summer institutes and 18 online courses, ESTEP has provided environmentally-focused professional develop to 565 Minnesota teachers.

Based on teacher input, ESTEP has expanded its repertoire of summer “bootcamps” to focus on specific environmental benchmarks. Summer programs for high school teachers carry themes targeting Minnesota hydrology, climate, natural resources, stability and change, astronomy and human impact on the environment. Minnesota Rocks and Natural Resources for ESTEP Teachers is our most popular online course.

Pre-program instruments on the impact of the ESTEP program were taken by the 99 teachers enrolled in the six, 2024 summer programs. Now, after five months of teaching earth science this school year, post-program data has been collected and analyzed in Activity 3 of this report. This year’s data show again that ESTEP teachers are implementing a more environmentally- and Minnesota-focused earth science curriculum. Summer 2024 pre/post content test results are also provided.

ESTEP continues to achieve its promised outcomes.

Activity 1
All Activity 1 Milestones have been met. All planning of summer program agendas, logistics, marketing and online syllabi are completed.

ESTEP will host one more, five-day “bootcamp” for high school teachers, June 16-20, at Winona State University. This is based on requests by teachers for this specific content. ESTEP will also provide one more summer online course in June. Both programs will conclude before the end of grant funding on June 30, 2025.

The ESTEP final report, due by August 14, will include pre/post content test results from the Winona astronomy program, attendance numbers from both final online and in-person courses, and the final number of teachers who participated in the three years of ESTEP.

Activity 2
All Milestones in Activity 2 are completed with the exception of the two final programs to be offered in June 2025. Summer “bootcamps” in 2022 (three programs), 2023 (three programs), and 2024 (six programs) have been completed serving 219 teachers. Online courses (18 total) have served 346 teachers from across the state. See "ESTEP 2023-24 Attendance Info" in Attachments for fall and spring online course attendees with names, schools, districts and represented Minnesota counties.

Activity 3
For Activity 3, all Milestones are completed. Milestones #6-7 are an analysis of teacher survey data collected before

attending an ESTEP summer program in 2024 and re-surveyed data obtained in February 2025. Pre/post analysis measure the impact of ESTEP programs on teaching and earth/environmental curricula in Minnesota schools. See “ESTEP 2024 Pre-Post Data Analysis” in Attachments.

Analysis of data matched to project goals show:

1) Increase teacher content knowledge – all teachers pre/post test scores improved an average of 46% in 2024 programs. The three-year average gain in content knowledge is 51%.

2) Increase skills in 3D instruction – comfort with 3D instruction showed an 83% increase in 2024 and an average 250% increase over three years. The use of specific 3D strategies rose an average of 109% with a three-year average of 113%.

3-4) Increase curriculum time and confidence in environmental topics – average of all environmental-related statements rose 21%, with a three-year average of 67%. Using Minnesota resources as the context for lessons rose an average 96% with an average of 96% over three years!

5) Increase outdoor learning – average increase of 97% in teaching lessons outdoors, with a three-year average of 145%.

Dissemination

The MnSTA homepage displays an ESTEP banner at the upper right. Clicking on this banner sends teachers to ESTEP information and online registration. www.mnsta.org

All ESTEP-related webpages, PowerPoints, and papers used in instruction carry the LCCMR logo and required verbiage.

At the MnSTA conference, November 1-2, 2024, in St. Cloud, three ESTEP-related sessions were provided, two led by ESTEP past participants and one by an ESTEP instructor. All acknowledged LCCMR funding for ESTEP.

Teacher comments regarding their ESTEP experience have been overwhelmingly positive. A sample of “ESTEP Teacher Testimonials” is provided in Attachments.

As part of ESTEP 2.0 (2025-149) funding from LCCMR, MnSTA is developing an online repository for Minnesota earth/environmental science teachers where ESTEP teachers will share lessons and resources statewide. (See "ESTEP 2.0 Announcement" in Attachments.)

The ESTEP Team and MnSTA will continue to spread the news of how Minnesota ENRTF funds have supported implementation of the new state science standards, eased the transition for science teachers, and enriched environmental education statewide.

Status Update Reporting

Status Update September 1, 2024

Date Submitted: October 29, 2024

Date Approved: October 30, 2024

Overall Update
The Earth Science Teachers Education Project (ESTEP) continues to deliver its much-needed and well-received profession development, is meeting all project goals, and has expanded its summer in-person and year-round online offerings to meet the needs of teachers.

Since the March 2024 report, ESTEP has completed three spring 2024 online courses serving 67 teachers and delivered six summer "bootcamps" in the Metro, St. Cloud, Mankato and Cloquet. Adding in the one summer online course, ESTEP engaged 125 teachers in summer 2024. To date, with completion of 12, five-day summer institutes and 11 online courses, ESTEP has provided environmentally-focused professional development to 465 Minnesota teachers.

Pre-program instruments on the impact of the ESTEP program were taken by the 99 teachers enrolled in the 2024 bootcamp summer programs. Post-program data will be collected in January and analyzed for the March 2025 report.

Content tests showed an average 54% increase pre to post this summer. (Test results in Attachments.) Responses to environmentally-focused statements show that confidence in understanding Earth and Environmental concepts rose 61%; using Minnesota examples in their lessons rose 91%; understanding of Minnesota natural resources, up 67%; and comfort in using the outdoors as a classroom rose 103%.

ESTEP is succeeding.

Activity 1
All Activity 1 milestones have been partially or completely met. Milestones #1-3 are complete. Please note for Milestone #1, the 6th grade summer bootcamps have a new agenda design that has three days of in-person instruction and field investigations and two days online. The program is still five-days long but modified to reduce housing/travel expenses and childcare costs. To increase enrollment, ESTEP will expand the 6th grade teacher audience to include other elementary grades, especially 4th grade, which contains multiple earth/enviromental science benchmarks.

Milestone #4 keeps expanding as new online courses are requested by teachers. ESTEP now offers seven different online courses and may add one or two more.

ESTEP continues to grow, especially in the online courses and high school teacher enrollment. With the new graduation requirement that all students take a high school earth science course, high school science teachers have flocked to ESTEP summer programs and online courses to enrich their content knowledge and pedagogical skills while building networks of support with other high school teachers who are designing new earth/environmental science courses for their schools. ESTEP is meeting the needs of these teachers while improving and expanding environmental education in Minnesota.

Activity 2
Milestone #1 in Activity 2 has been completed with three programs serving 65 teachers in summer 2022. ESTEP provided two, 5-day environmentally-focused programs in Metro and Alexandria for 51 sixth grade teachers, and one 5-day program for 14 high school earth/environmental science teachers at MSU-Moorhead. See Attachments for "ESTEP 2022

Attendance Info".

Milestone #2 has been completed, serving 55 teachers in summer 2023 with three, 5-day programs in Cloquet, Apple Valley and Moorhead. See Attachments for "ESTEP 2023 Attendance Info" including teachers' names, school, and county.

Milestone #3 is well underway with a total of 248 teachers having participated in seven different ESTEP online courses to date. Four fall online courses are underway at the time of this report serving an additional 52 teachers from throughout the state. ESTEP will offer another set of online courses in spring 2025.

Milestones #4 is complete, but ESTEP provided not five but six, five-day summer programs for teachers in the Metro, St. Cloud, Mankato and Cloquet serving 99 teachers. See Attachments for "ESTEP 2024 Attendance Info".

Activity 3

For Activity 3, Milestones #1-6 are completed. Milestone #7 will be completed when data is collected and analyzed for summer 2024 programs. Pre/post teacher testing and attitudinal survey results from summers 2022 and 2023 can be found in Attachments as "ESTEP 2022 Pre-Post Data Analysis" and "ESTEP 2023 Pre-Post Data Analysis".

Analysis of data to meet Milestone #6 matched to grant goals show:

1) Increase teacher content knowledge – all teachers pre/post test scores improved an average of 29% for 6th grade and 64% for high school in all programs with an overall 51% increase in test scores.

2) Increase skills in 3D instruction – comfort with 3D instruction showed a 346% increase in 2023 – an average 336% increase over two years. The use of specific 3D strategies rose an average of 103%, with a two-year average of 106%.

3-4) Increase curriculum time and confidence in environmental topics – average of all environmental-related statements rose 58%, with a two-year average of 60%. Using Minnesota resources as the context for lessons rose an average 96% - an average of 88% over two years!

5) Increase outdoor learning – average increase of 165% in using the outdoors, with a two-year average of 122%.

Dissemination

The MnSTA homepage displays an ESTEP banner at the upper right. Clicking on this banner sends teachers to ESTEP information and online registration. www.mnsta.org

All ESTEP-related webpages, PowerPoints, and papers used in instruction carry the LCCMR logo and required verbiage.

At the MnSTA statewide conference, November 10-11, 2023, in Rochester, multiple ESTEP-related sessions were held, some led by ESTEP past participants. All acknowledged LCCMR funding. ESTEP related presentations are being planned now for the upcoming MnSTA conference in St. Cloud, November 1-2, 2024.

Articles on the ESTEP program have appeared in the MnSTA Newsletter, Minnesota Educator PD News, and the Geological Society of Minnesota News. (See Attachments.)

Teacher comments regarding their ESTEP experience have been overwhelmingly positive. A sample of "ESTEP Teacher Testimonials" is provided in Attachments.

MnSTA will develop an online repository for Minnesota earth science teachers to share lessons and resources beginning

in July 2025 with new ESTEP 2.0 (2025-149) funding. (See "ESTEP 2.0 Announcement" in Attachments.)

The ESTEP Team and MnSTA will continue to spread the news of how Minnesota ENRTF funds have supported the new state science standards, eased the transition for science teachers, and enriched environmental education statewide.

Status Update Reporting

Status Update March 1, 2024

Date Submitted: February 27, 2024

Date Approved: May 21, 2024

Overall Update
The Earth Science Teachers Education Project (ESTEP) is moving along on schedule and reaching its promised outcomes.

Since the September 2023 report, ESTEP has developed and delivered seven, well-received online courses involving 155 teachers enrolled from throughout the state. To date, with completion of six, five-day summer institutes and 10 online courses, ESTEP has provided environmentally-focused professional develop to 342 Minnesota teachers.

Based on teacher input, ESTEP has expanded its repertoire of online courses beyond Astronomy, Meteorology, and an advanced course in Geosciences called Earth Essentials to include three new courses - Teaching Environmentally-focused Earth Science in 3D, Geoscience for Elementary and Middle School ESTEP Teachers, and Minnesota Rocks and Natural Resources for ESTEP Teachers.

Pre-program instruments on the impact of the ESTEP program were taken by the 55 teachers enrolled in the 2023 summer programs. Now, after five months of teaching earth science this school year, post-program data has been collected and analyzed in Activity 3 of this report. This year's data show again that participant teachers in ESTEP programs are implementing a more environmentally- and Minnesota-focused earth science curriculum. Summer 2023 pre/post content test results are also provided.

ESTEP continues to achieve its promised project outcomes.

Activity 1
All Activity 1 milestones have been partially or completely met. But with input from teachers suggesting new online courses; new high school summer programs addressing new topics; and with the ESTEP team planning to revamp the summer 6th grade syllabi, Milestones #1 and #4 will continue active as the project evolves to meet the needs of Minnesota science teachers.

ESTEP has added three new online courses this year alone, and the 6th grade institutes will probably drop to a three-day summer program with completion of the final two days online.

MnSTA continues to meet Milestone #3 by providing online marketing and registration for ESTEP. Concerns continue regarding 6th grade teacher enrollment for summer 2024, but to date all three scheduled programs in Rochester, Metro and Bemidji have registrants, and for the four high school programs scheduled for Duluth, Mankato, Metro and St. Cloud, two are already full.

Activity 2
Milestone #1 in Activity 2 has been completed with three programs serving 65 teachers in summer 2022. ESTEP provided two, 5-day environmentally-focused programs in Metro and Alexandria for 51 sixth grade teachers, and one 5-day program for 14 high school earth/environmental science teachers at MSU-Moorhead. (See "ESTEP 2022 Attendance Info" in Attachments.)

Milestone #2 has been completed, serving 55 teachers in summer 2023 with three, 5-day programs in Cloquet, Apple

Valley and Moorhead. See Attachments for “ESTEP 2023 Attendance Info” including teachers’ names, school, and county.

Milestone #3 is well underway with a total of 155 teachers having participated in seven online courses to date. Three spring 2024 online courses are underway at the time of this report serving 67 teachers from throughout the state. See “ESTEP 2023-24 Attendance Info” in attachments for course titles and enrollments.

Milestones #4, due for completion in August 2025, is planned and scheduled. (See Attachments for summer bootcamp schedules.)

Activity 3

For Activity 3, Milestones #1-6 are completed. Milestone #7 will be completed when data is collected and analyzed for summer 2024 programs. Pre/post teacher testing and attitudinal survey results from summer 2023 can be found in Attachments as “ESTEP 2023 Pre-Post Data Analysis”.

Analysis of data to meet Milestone #6 matched to grant goals show:

1) Increase teacher content knowledge – all teachers pre/post test scores improved an average of 29% for 6th grade and 56% for high school in 2023 programs. The two-year average gain is 36% for 6th grade and 57% for high school, or 47% overall.
2) Increase skills in 3D instruction – comfort with 3D instruction showed a 346% increase in 2023 – an average 336% increase over two years. The use of specific 3D strategies rose an average of 103%, with a two-year average of 113%.
3-4) Increase curriculum time and confidence in environmental topics – average of all environmental-related statements rose 58%, with a two-year average of 60%. Using Minnesota resources as the context for lessons rose an average 96% - an average of 88% over two years!
5) Increase outdoor learning – average increase of 165% in using the outdoors, with a two-year average of 122%.

Dissemination

The MnSTA homepage displays an ESTEP banner at the upper right. Clicking on this banner sends teachers to ESTEP information and online registration. www.mnsta.org

All ESTEP-related webpages, PowerPoints, and papers used in instruction carry the LCCMR logo and required verbiage.

At the MnSTA conference, November 10-11, 2023, in Rochester, multiple ESTEP-related sessions were held, some led by ESTEP past participants. All acknowledged LCCMR funding for ESTEP.

Since the last report, articles on the ESTEP program have appeared in the MnSTA Newsletter, Minnesota Educator PD News, and the Geological Society of Minnesota News. (See Attachments.)

Teacher comments regarding their ESTEP experience have been overwhelmingly positive. A sample of “ESTEP Teacher Testimonials” is provided in Attachments.

MnSTA is developing an online repository for Minnesota earth science teachers to share lessons and resources. The ESTEP Team and MnSTA will continue to spread the news of how Minnesota ENRTF funds have supported the new state science standards, eased the transition for science teachers, and enriched environmental education statewide.

Status Update Reporting

Status Update September 1, 2023

Date Submitted: September 8, 2023

Date Approved: September 8, 2023

Overall Update
The Earth Science Teachers Education Project (ESTEP) continues to deliver its needed and well-received programs.

Online courses began in spring 2023 with instruction in astronomy and meteorology serving 45 teachers from throughout the state. Summer 2023 courses in Geosciences served another 51 teachers. (Fall 2023 online courses have 63 enrolled.)

In summer 2023, ESTEP hosted three, five-day programs in Cloquet (June 26-30), Apple Valley (July 10-14) and Moorhead (July 24-28) serving a total of 55 teachers. Two planned 6th grade programs in Mashall and Cloquet were cancelled due to low enrollment. Those registered were provided spaces in the Apple Valley workshop.

Adding the 65 teachers enrolled in ESTEP programs from our September 2022 report, ESTEP has provided environmentally-focused professional development to 216 Minnesota teachers.

Pre-program instruments on the impact of the ESTEP program have been taken by the 55 teachers enrolled in summer programs this year. Post data will be collected and analyzed in February and included in the March 1st report. Last year's data show that participant teachers in ESTEP programs are implementing a more environmentally- and Minnesota-focused science curriculum. Summer 2023 pre/post content test results are provided in Attachments.

ESTEP continues to achieve its promised project outcomes.

Activity 1
All Activity 1 milestones have been partially or completely met. Syllabi, locations, dates, marketing, and pre/post assessments for the three years of the project have been completed. However, though detailed agendas have been completed for all 6th grade programs and current online courses, the high school syllabi continue to evolve as new courses are added and will need to be planned. Teachers have requested topics for new online courses that will require planning. All programs are running very well.

Online courses over the spring and summer have served 96 teachers. Summer "bootcamps" in 2023 have served 55 teachers for a total of 151 teachers attending ESTEP programs in 2023.

MnSTA continues to provide marketing and online registration for ESTEP. An issue has arisen regarding reaching 6th grade teachers. ESTEP conveniently hosts programs around the state, but marketing in the Mankato, Cloquet and Mashall areas did not provide enough teachers to run these programs. Speculation is that the new standards have not "hit" greater Minnesota schools yet, and that rural teachers are simply more isolated and harder to reach.

Activity 2
Milestone #1 in Activity 2 has been completed with three programs. In summer 2022, ESTEP provided two environmentally-focused programs in Metro and Alexandria for 51 sixth grade teachers, and one 5-day program for 14 high school earth/environmental science teachers at MSU-Moorhead. An additional 6th grade summer program, scheduled in Mankato, was cancelled due to low enrollment.

Milestone #2 has been completed, serving 55 teachers, but with three summer programs instead of five. As outlined previously, two 6th grade programs scheduled for Cloquet and Marshall were cancelled due to low registrations. See Attachments for "ESTEP 2023 Attendance Info" including teachers' names, school, and county.

Milestone #3 is well underway with a total of 96 teachers completing four online courses this spring/summer. Spring 2023 included two online courses in astronomy and meteorology for 45 teachers. Summer 2023 had two Geoscience online courses serving 51 teachers. Fall 2023 online will again have astronomy and meteorology and a new course: "Teaching Environmentally-focused Earth Science in 3D". Fall courses have 63 teachers enrolled.

Milestones #4, due for completion in August 2025, is planned and scheduled. (See Attachments for summer bootcamp schedules.)

Activity 3

Milestones #1, #2 and #3 are complete. Pre/post surveys have been developed and administered. Pre/post teacher testing from this summer to meet Milestone #2 can be found in Attachments.

Milestone #4 will be partially met as collecting student data was discouraged by teachers. However, the teacher survey instrument provides sufficient data to measure the integration of Minnesota environmental topics into curricula.

Analysis of data to meet Milestone #6 follows as presented in the September 2022 report:

1) Increase teacher content knowledge – all teachers pre/post test scores improved an average of 42% for 6th grade and 60% for high school.

2) Increase skills in 3D instruction – comfort with 3D instruction showed an average 325% increase. The use of specific 3D strategies rose an average of 94%.

3-4) Increase curriculum time and confidence in environmental topics – average of all environmental-related statements rose 62% in agreement. Using Minnesota resources as the context for lessons rose an average 80%!

5) Increase outdoor learning – average increase of 78% in using the outdoors.

See Attachments for full ESTEP 2022 Data Analysis. Post-attitudinal survey for 2023 summer participants (Milestone #5) will be administered in February 2024 with analysis presented in the March 2024 report.

Dissemination

The MnSTA homepage displays an ESTEP banner at the top directing teachers to ESTEP information. Clicking on this banner sends teachers to ESTEP information and online registration.

All ESTEP-related webpages, PowerPoints, and papers used in instruction carry the LCCMR logo and required verbiage.

The MnSTA annual conference in Duluth, November 3-5, 2022 had multiple sessions presented on the ESTEP initiative and earth/environmental science professional development for teachers using ENRTF funds. At the MnSTA conference this year, November 10-11 in Rochester, multiple ESTEP sessions are proposed including some led by ESTEP past participants. The Spring-edition of the MnSTA newsletter carried photos and a story on ESTEP. (See Attachments.)

MnSTA is developing an online repository for Minnesota earth science teachers to share lessons and resources. The ESTEP Team and MnSTA will continue to spread the news of how Minnesota ENRTF funds have supported the new state science standards, eased the transition for science teachers, and enriched environmental education statewide.

Status Update Reporting

Status Update March 1, 2023

Date Submitted: February 27, 2023

Date Approved: March 20, 2023

Overall Update
The Earth Science Teachers Education Project (ESTEP) is on schedule to deliver its promised programs. Syllabi, locations, dates, marketing, and pre/post assessments for the three years of the project have all been completed.

In summer 2022, ESTEP provided two environmentally-focused, 5-day, "bootcamp-style", standards-based professional development programs located in the Metro (July 18-22) and Alexandria (August 8-12), for 51 sixth grade teachers of science, and one 5-day program for 14 high school earth/environmental science teachers at MSU-Moorhead (July 25-29). A third 6th grade summer program, scheduled for July 25-29 in Mankato, was cancelled due to low enrollment. Those registered were provided spaces in the Metro and Alexandria workshops.

Fifty science teachers from throughout the state are currently enrolled in two online courses in Astronomy and Atmospheric sciences in spring 2023

Evaluation instruments on teacher learning and impact of the ESTEP program on pedagogy and classroom implementation of the new science standards with an environmental emphasis have been collected, analyzed and are summarized in Activity 3 of this report. Data show that participant teachers in ESTEP programs are implementing a more environmentally- and Minnesota-focused science curriculum using a three-dimensional (3D) approach to instruction.

ESTEP is achieving its promised project outcomes.

Activity 1
All Activity 1 milestones have been partially or completely met. Detailed agendas have been completed for all 6th grade summer programs and online courses, but the high school syllabi continue to evolve as new courses have been added and will need to be planned.

Based on input from high school science teachers, their summer two-week institutes have been reorganized into four, focused, 5-day "courses" addressing specific content, to include physical geology, hydrology, meteorology/climate, and astronomy. This is a move away from the "cohort" model to a series of content choices. This will allow ESTEP to serve more high school teachers while meeting their needs for earning 9-12 ESS licensure.

Online course planning and scheduling have been completed. Unfortunately, ESTEP did not run the planned series of fall 2022 online courses due to administrative challenges at MSU-Moorhead. Spring 2023 includes two online courses for teachers in astronomy and meteorology. Both courses are full. MSU-Morehead has limited online registrations to 25 per course reducing the number of teachers served by these courses.

MnSTA provided marketing and online registration for ESTEP participants.

See Attachments for 6th grade and high school 5-day scheduled summer programs, plus online course schedule and descriptions.

Activity 2

Milestone #1 in Activity 2 has been completed. In summer 2022, ESTEP provided two environmentally-focused, 5-day, "bootcamp-style", standards-based professional development programs located in the Metro (July 18-22) and Alexandria (August 8-12), for 51 sixth grade teachers of science, and one 5-day program for 14 high school earth/environmental science teachers at MSU-Moorhead (July 25-29). A third 6th grade summer program, scheduled for July 25-29, was cancelled due to low enrollment. Those registered for the Mankato program were provided spaces in the Metro and Alexandria workshops. See Attachments for "ESTEP 2022 Attendance Info" including teachers' names, school, and county.

Milestone #3 is underway with 50 science teachers from throughout the state currently enrolled in two, spring 2023 online courses in Astronomy and Atmospheric sciences through MSU-Moorhead.

Milestones #2 and #4, due for completion in August 2023 and 2024 respectively, are planned and scheduled. (See Attachments for schedules.) ESTEP has dropped the cohort model for high school teachers and replaced it with a series of content-focused, 5-day summer programs in physical geology, hydrology, meteorology/climate, and astronomy. This will allow more high school teachers to participate in ESTEP while choosing the earth science topics they feel need review and more study.

Activity 3

Milestones #1 and #3 are complete. Pre/post surveys were developed and administered. Milestone #2 will be partially met as teacher pre/post tests were administered but testing of students was discouraged by teachers due to COVID and amount of testing students already experience. Without teacher by-in, Milestone #4 cannot be met directly. However, the survey instrument provides sufficient data to measure the integration of Minnesota environmental topics into curricula.

In order to provide concrete data for this report, the post-attitudinal survey was administered in February 2023. Analysis of data to meet Milestone #5 follows for each project outcome:

1) Increase teacher content knowledge – all teachers pre/post test scores improved an average of 42% for 6th grade and 60% for high school.

2) Increase skills in 3D instruction – comfort with understanding 3D instruction showed an average 325% increase. The use of specific 3D strategies rose an average of 94%.

3-4) Increase curriculum time and confidence in environmental topics – average of all environmental-related statements rose 62% in agreement. Using Minnesota resources as the context for lessons rose an average 80%!

5) Increase outdoor learning – average increase of 78% in using the outdoors.

See Attachments for full ESTEP 2022 Data Analysis.

Dissemination

The MnSTA homepage displays an ESTEP banner at the top directing teachers to ESTEP information. All ESTEP-related webpages, PowerPoints, and papers used in instruction carry the LCCMR logo and required verbiage. At the MnSTA annual conference in Duluth, November 3-5, multiple sessions presented on the ESTEP initiative and earth/environmental science professional development for teachers using ENRTF funds. The Winter-edition of the MnSTA newsletter carried photos and a story on ESTEP, and Minnesota Educator featured a short article. (See Attachments for both.)

MnSTA is working on developing an online repository for Minnesota earth science teachers to share lessons and resources. The ESTEP Team and MnSTA will continue to spread the news of how Minnesota ENRTF funds have supported the new state science standards, eased the transition for science teachers, and enriched environmental education statewide.