Environment and Natural Resources Trust Fund (ENRTF)
M.L. 2017 LCCMR Work Plan

Date of Report: 10 October 2016

Date of Next Status Update Report: 31 December 2017

Date of Work Plan Approval: 06/07/2017

Project Completion Date: 30 June 2019

Does this submission include an amendment request? No

PROJECT TITLE: **Expanding Raptor Center Online Education**

Project Manager: Julia Ponder

Organization: University of Minnesota

Mailing Address: 1920 Fitch Avenue

City/State/Zip Code: St. Paul, MN 55108

Telephone Number: (612)624-3431

Email Address: ponde003@umn.edu

Web Address: www.TheRaptorCenter.org

Location: Statewide

Total ENRTF Project Budget:		
	ENRTF Appropriation:	**$270,000**
	Amount Spent:	**$0**
	Balance:	**$270,000**

Legal Citation: M.L. 2017, Chp. 96, Sec. 2, Subd. 05d

Appropriation Language:
$270,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota, Raptor Center, to provide environmental education for approximately 15,000 middle-school students and 600 teachers, combining classroom learning and outdoor experiences with technology, scientific investigation of birds, and conservation projects. This appropriation is available until June 30, 2022, by which time the project must be completed and final products delivered.

I. PROJECT TITLE: Bridging Classroom and Outdoor Learning by Studying Birds

II. PROJECT STATEMENT:
The Raptor Center (TRC) will partner with the University of Minnesota (UMN) Learning Technologies Media Lab (LTML), University of Minnesota Extension, and regional environmental education experts from Wolf Ridge Environmental Learning Center and Eagle Bluff Environmental Learning Center, to create the *Bridging Classroom and Outdoor Learning by Studying Birds* program. This program will blend two existing curriculum, the web-based Raptor Lab platform with Extension's Driven to Discover (D2D) citizen science curriculum to create an online platform that utilizes technology to guide students in the completion of outdoor citizen science projects involving birds. The Raptor Lab will also focus on empowering teachers by providing tools they need to successfully implement outdoor learning projects with their students. Demonstrations, offered by experts in environmental education, will model for teachers how to effectively use these tools in outdoor settings.

The *Bridging Classroom and Outdoor Learning by Studying Birds* program will integrate TRC's Raptor Lab, funded by the Minnesota Environment and Natural Resources Trust Fund in 2014, with the University of Minnesota Extensions' *D2D Facilitator's Guide to Citizen Science | Birds* curriculum funded by the National Science Foundation. D2D is a proven curriculum aimed at fifth through tenth grade students. Integrating this curriculum into the Raptor Lab platform will allow these outdoor student scientists to upload images, sounds, videos, GPS points, and observation notes of the birds they observe in the wild directly into their online environmental science projects.

If Minnesota students are to grow into adults who are capable of making meaningful contributions to conservation, both they and their teachers need effective tools to guide outdoor environmental learning projects. This project will give both teachers and students those much-needed tools. Specifically, we will leverage the Raptor Lab online platform for the *Bridging Classroom and Outdoor Learning by Studying Birds* project by:

- Modifying part three of the Raptor Lab to integrate established paper-based curriculum, *D2D Facilitator's Guide to Citizen Science | Birds*, into online lessons for the Raptor Lab platform. The existing Raptor Lab platform, which already offers a visually engaging and interactive online environment, will allow students to share the findings of their science-based "mini-investigations" they conduct outdoors on birds as described in the D2D curriculum. Students will be able to share their projects with classmates, teachers, students in other schools, and people in their community.
- Expanding the Raptor Lab to include a teacher management system allowing educators to track student progress and evaluate student work.
- Expanding the Raptor Lab's existing teacher toolbox to effectively support teachers in the implementation of the online version of the D2D curriculum.

To develop the *Bridging Classroom and Outdoor Learning by Studying Birds* program, LTML will provide the technical and educational expertise to modify the Raptor Lab's online environment. Modifications will include: integration of the D2D curriculum into module 3 of the Raptor Lab, integration of an in-depth teacher management system allowing teachers to access, track, and provide feedback on student work, expanded teacher toolbox providing teachers with the appropriate resources, curriculum, and activities to accommodate the D2D modification of the Raptor Lab in their classrooms, and the integration of ArcGIS mapping software allowing students to engage with technology to do robust data analysis and mapping.

Extension will provide the D2D curriculum expertise. Extension will advise on the design and development of the Raptor Lab module 3 modifications to retain content and general look and feel of the Extension-branded D2D curriculum materials so participants can easily recognize the online environment as a complementary component of the D2D materials. The D2D modified online environment will directly support students in the process of conducting student driven environmental investigations allowing students to directly apply their critical thinking skills and knowledge of the process of scientific investigation developed in parts 1 and 2 of the Raptor Lab. Extension will consult with TRC on the design and development of the teacher demonstrations.

Based on their experience with the D2D project (which included similar demonstrations), Extension will help set the agenda for the teacher demonstrations, develop training materials, and instructional activities. Extension will also assist in the development and delivery of training the coordinators and instructors who will be responsible for presenting the demonstrations around the state.

Regional experts in environmental education, Wolf Ridge and Eagle Bluff, will also consult on the design and development of the teacher demonstrations. Staff from Wolf Ridge will be responsible for providing 20 teacher demonstrations in northern Minnesota, Eagle Bluff 20 demonstrations in southern Minnesota, and TRC 20 demonstrations in central Minnesota, including the metro area. A total of sixty teacher demonstrations will be provided throughout the state to achieve maximum adoption by Minnesota schools. These demonstrations will strive to bring the Raptor Lab and its outdoor investigation curriculum to 600 classrooms and reach nearly 15,000 fifth through tenth grade students. The *Bridging Classroom and Outdoor Learning by Studying Birds* program will empower teachers to feel comfortable bringing their classrooms outdoors in an effort to create in their students a knowledge of environmental issues facing birds, inspire these young minds to become more conservation oriented and even consider careers in the environmental sciences.

III. PROJECT STATUS UPDATES:

Project Status as of 31 December 2017:

Project Status as of 30 June 2018:

Project Status as of 31 December 2018:

Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Expand Raptor Lab Online Platform
Description: The Raptor Lab online learning environment enhancements will be designed and developed by the Learning Technologies Media Lab (LTML) based on feedback from teachers using the existing Raptor Lab online environment. These enhancements will ensure that the environment encompasses all facets of a successful adventure learning (AL) program as well as ensure that scaffolds and supports for teachers as well as learners are firmly in place. The Raptor Lab online learning environment enhancements include an innovative new Outdoor Birding Module based on existing D2D curriculum. We will also design, develop, and build a teacher management system that will allow educators to effectively manage and assess student learning, increasing the functionality of the curriculum. We will add ArcGIS capability to the Raptor Lab environment to provide enhanced data analysis tools for students, and expand the Teacher Toolbox to include added resources, updated activities, adapted curriculum, new assessment tools, and benchmarks linking the curriculum to state standards. We will also create two outdoor conservation projects that clearly demonstrate both to teachers and students how to conduct an outdoor conservation project using the Raptor Lab online environment. Previously developed online assessment tools for both students and teachers will be evaluated and improved by an assessment consult to maximize the effectiveness of Raptor Lab student assessments and teacher evaluations.

Summary Budget Information for Activity 1:	**ENRTF Budget:**	**$ 99,614**
	Amount Spent:	**$ 0**
	Balance:	**$ 99,614**

Outcome	Completion Date

1. Add a new Outdoor Birding online module to the existing Raptor Lab platform by adapting the existing paper-based Driven to Discover curriculum	*12-31-2017*
2. Add a Teacher Management System to the existing Raptor Lab platform	*12-31-2017*
3. Integrate ArcGIS capability into the existing Raptor Lab platform	*6-1-2018*
4. Expand the existing Raptor Lab Teacher Toolbox to accommodate the Driven to Discover curriculum	*6-1- 2018*
5. Create two online outdoor conservation projects	*6-1- 2018*

Activity 1 Status as of 31 December 2017:

Activity 1 Status as of 30 June 2018:

Activity 1 Status as of 31 December 2018:

Final Report Summary:

ACTIVITY 2: Obtaining Maximum Adoption

Description: To obtain maximum adoption, TRC will partner with Extension and regional experts in Environmental Education, Wolf Ridge and Eagle Bluff Environmental Learning Centers, to design and develop teacher demonstrations of the Raptor Lab with D2D modifications aimed at modeling outdoor student investigations. Demonstrations will be free to participants and will take place throughout the state of Minnesota. Scheduling demonstrations will be coordinated in northern Minnesota by staff at Wolf Ridge, in southern Minnesota by staff at Eagle Bluff, and in central Minnesota (including the metro area) by staff at TRC. Each organization will use their robust database of schools engaged in their programming to identify potential schools interested in hosting a Raptor Lab demonstration. Each region will be responsible for conducting 20 demonstrations from June 2018 through the end of June 2019 reaching approximately 200 teachers in their region. Overall, 60 demonstrations will be held throughout the state reaching 600 teachers using the Raptor Lab in their classrooms engaging nearly 15,000 students. Staff from these organizations, in cooperation with staff from Extension, will identify, acquire, and or create all the supporting materials required for the demonstrations. Locations with the proper technology, computer labs or media centers with internet access, will be identified so participants can have a hands-on experience with the Raptor Lab. Teacher guides will be created that break down the main learning outcomes of the curriculum, how those outcomes meet state standards, identification of important principles of environmental education and outdoor classroom management, step-by-step instructions on the process of conducting an outdoor investigation, and access to important resources to support teachers and to build content knowledge for students. Two follow-up teleconference calls will be provided to follow-up with teachers using the Raptor Lab. These teleconference meetings will support teacher implementation of the Raptor Lab by offering an opportunity for teachers to ask questions and have them answered by both program staff and other teachers, provide feedback of the curriculum, develop ideas of how to use the curriculum by listening to what other teachers are doing, develop networking between teachers so they can act as resources for each other, highlight the successful completion of student projects, and to share lessons learned. Program staff will facilitate 120 follow-up teleconference meetings with school to help obtain maximum buy-in. An assessment consultant will assist in the design and development of teacher evaluation forms to allow teachers to evaluate the teacher demonstrations. Teacher evaluations will continue to inform future demonstrations.

Summary Budget Information for Activity 2:

ENRTF Budget: $ 170,386
Amount Spent: $ 0
Balance: $ 170,386

Outcome	Completion Date
1. Develop supporting materials such as teacher guides	*6-1-2018*

2. Design and develop demonstrations	*6-1-2018*
3. Through partnerships with regional experts present 60 demonstrations	*6-30-2019*
4. Facilitate 120 follow-up teleconference meetings with schools to obtain maximum buy-in	*6-30-2019*
5. Reach more than 15,000 students with the Outdoor Birding module	*6-30-2019*

Activity 2 Status as of 31 December 2017:

Activity 2 Status as of 30 June 2018:

Activity 2 Status as of 31 December 2018:

Final Report Summary:

V. DISSEMINATION:

Description: TRC, LTML, Wolf Ridge, and Eagle Bluff all have databases of schools that have directly engaged in their programming. These databases will provide a robust and diverse listing of schools from all over the state currently integrating environmental education into their classrooms. These databases will be used to contact schools to identify those willing and interested in hosting Raptor Lab demonstrations. Email advertisements, direct calling, and in person meetings will be used to establish connections to host demonstrations. In addition, TRC and partners will present at teacher conferences, administrator/principle conferences, Minnesota Education Conference, and Minnesota Science Teachers Association conference to reach new audiences. Lastly, the Raptor Lab will be presented at professional conferences within the fields of education, environmental education, and learning technologies to help advance these fields in education.

Status as of 31 December 2017:

Status as of 30 June 2018:

Status as of 31 December 2018:

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. Preliminary ENRTF Budget Overview:

***This section represents an overview of the preliminary budget at the start of the project. It will be reconciled with actual expenditures at the time of the final report.**

Budget Category	$ Amount	Overview Explanation
Personnel:	$ 165,237	Project manager (1) 3% FTE, 2 years (UMN faculty on 100% soft/philanthropic money): Grant oversight and sponsor reporting Program manager (1) 50% FTE, 2 years: Responsible for day-to-day logistics, adaption of content into online format, teacher assessment question development, interdepartmental communications, team planning, payroll reporting, and contractor invoicing management. Online designer (1) 25% FTE 1.5 years

		Responsible for the design and development of the online learning environment redesign, teacher management system, integration of ArcGIS, expanded teacher toolbox, and digital teacher assessment tool. Computer programmer (1) 40% FTE 1.5 years Responsible for building the redesign of the online learning environment, teacher management system, integration of ArcGIS, and expanded teacher toolbox Coordinator (1) 40% FTE, 2 years Responsible for providing expertise on the design and development of the teacher demonstrations, managing 11 instructors (2 regional coordinators and 8 instructors), overseeing demonstration scheduling and presentation development, scheduling 20 demonstrations in the central Minnesota and metro area, presenting 10 demonstrations, facilitating 10 follow-up cohort tele-meetings, reimbursement for invoicing, and budget. Content expert (1) 8% FTE 1 year Responsible for advising the development of the D2D modifications within the Raptor Lab, assisting with the design and development of teacher demonstrations, and assisting with the design and delivery of the Train-the-Trainers workshop.
Professional/Technical/Service Contracts:	$ 98,500	Wolf Ridge and Eagle Bluff ELC for regional coordination of outstate workshops Design and development of the teacher demonstrations, including teacher materials, the identification and scheduling of demonstration locations, and the presentation of 20 teacher demonstrations each in outstate MN Three instructors (20% FTE each) for metro area workshops Responsible for 10 workshops and facilitate 10 follow-up cohort tele-meetings.
Printing	$5,263	Printed curriculum guides for participating teachers
Travel	$1,000	Travel for citizen science content expert from Rochester to metro area
TOTAL ENRTF BUDGET:	**$ 270,000**	

Explanation of Use of Classified Staff: N/A

Explanation of Capital Expenditures Greater Than $5,000: N/A

Total Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 3.0

Total Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 2.2

B. Other Funds:

Source of Funds	$ Amount Proposed	$ Amount Spent	Use of Other Funds
Non-state			
In-kind services during project period	$ 3,922	$	1% effort for 2 years for Aaron Doering (LTML/UMN faculty) – project design
TOTAL OTHER FUNDS:	**$ 3,922**	**$**	

VII. PROJECT STRATEGY:

A. Project Partners:

Project Partners Receiving Funds:

- Dr. Julia Ponder, Principal Investigator, University of Minnesota: $9,753: Project Management
- Andrea Lorek Strauss, Citizen Science and Driven to Discover Consultant, University of Minnesota Extension: $6,295: Citizen Science content expert
- Wolf Ridge E.L.C., Northern Minnesota Regional Coordinator: $40,000:
- Eagle Bluff E.L.C., Southern Minnesota Regional Coordinator: $40,000:

Project Partners Not Receiving Funds:

- Aaron Doering, co-PI, University of Minnesota Learning Technologies Media Lab, will provide overall design and development of all components of the online learning environment.

B. Project Impact and Long-term Strategy: This project is important because it directly addresses the need to improve science literacy among Minnesota students where the latest testing shows 50% of students are not proficient in science. Understanding the process of scientific investigation and how it can inform decision-making is critical to having an informed citizenry. This project will use birds to engage students in science as they investigate local, real-world environmental issues. Students will apply what they have learned from their classroom investigation in their own outdoor research projects.

TRC has been using raptors as education ambassadors for nearly 40 years. Traditionally, these programs have been a one-hour, one-time experience of 3 to 4 birds on the fist. In the fall of 2011, TRC created a pilot curriculum integration program at Rockford Middle School Center for Environmental Studies that focused on providing students with multiple experiences of raptors to create more powerful educational experiences. Repeat exposure to curriculum content reinforces learning allowing for greater retention than a single one-hour experience and therefore better facilitates long-term learning. The program also used live birds to create concrete learning opportunities for students focusing on specific Minnesota science standards to assist teachers in effectively covering those topics. This program was expanded in 2012 to Twin Oaks and Hidden Oaks Middle Schools in Prior Lake. The curriculum designed and integrated over this three-year period informed the development of the Raptor Lab online environment.

By expanding this curriculum into an online learning environment allowed:

- Students and schools to access the curriculum no matter their location or socio-economic situation.
- Technology and multimedia to be utilized to better teach about the curriculum content and provide opportunities to learn directly from experts out in the field.
- For a more resource efficient method for TRC to fulfill its outreach mission and provide world-class environmental education programming
- For a more economical alternative for teachers than the cost of having TRC come to their school

During its two years of development staff working on the Raptor Lab discovered teachers needed more resources to be empowered to take on outdoor learning projects with their students. To address this need, TRC and its partners are going to create the *Bridging Classroom and Outdoor Learning by Studying Birds* program to provide teachers with a proven outdoor science investigation curriculum driven by technology to support teachers in their efforts to get students outdoors. Direct impact of this project will be providing demonstrations on how to use the Raptor Lab to 600 teachers around the state and the nearly 15,000 students these teachers will reach. Integrated partnerships between TRC, UMN LTML, Extension, Wolf Ridge Environmental Learning Center, and Eagle Bluff Environmental Learning will provide long-term Raptor Lab exposure as these organizations highlight the Raptor Lab to the schools they serve.

C. Funding History:

Funding Source and Use of Funds	Funding Timeframe	$ Amount
The Raptor Center	2011-2014	$21,600
ENRTF	2015-2016	$186,000
		$ 207,600

VIII. REPORTING REQUIREMENTS:

- **The project is for 2 years, will begin on 07/01/17, and end on 06/30/2019.**
- **Periodic project status update reports will be submitted December 31 and June 30 of each year.**
- **A final report and associated products will be submitted between June 30 and August 15, 2019**.

IX. VISUAL COMPONENT or MAP(S): See attached

X. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS: N/A

Environment and Natural Resources Trust Fund
M.L. 2017 Project Budget

Project Title: Expanding Raptor Center Online Education
Legal Citation: M.L. 2017, Chp. 96, Sec. 2, Subd. 05d
Project Manager: Julia Ponder
Organization: University of Minnesota
M.L. 2017 ENRTF Appropriation: $ 270,000
Project Length and Completion Date: 2 Years, June 30, 2019
Date of Report: 14 September 2016

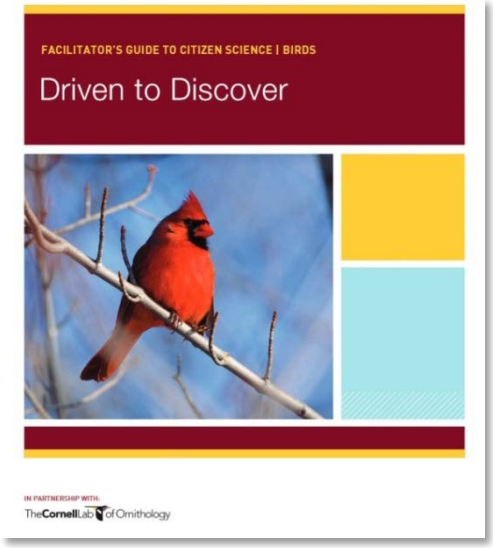
ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	Activity 2 Budget	Amount Spent	Activity 2 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	***Expand Raptor Lab Online Platform***			***Obtaining maximum adoption***				
Personnel (Wages and Benefits)	$94,114		$94,114	$71,123		$71,123	$165,237	$165,237
Principal investigator/project manager 1, $9,753 (68% salary 32% fringe, 3% FTE each year for 2 years)								
Program manager 1, $49,761 (77% salary, 23% fringe, 50% FTE each year for 2 years)								
Online designer 1, $22,869 (68% salary 32% fringe, 25% FTE each year for 1.5 years)								
Computer programmer 1, $38,342 ((77% salary 23% fringe, 40% FTE each year for 1.5 years)								
Teacher demonstrations coordinator 1, $38,220 (77% salary 23% fringe, 40% FTE each year for 2 years)								
Content expert - citizen science 1, $6,295 (77% salary, 23% fringe, 8% FTE each year for 1 year)								
Professional/Technical/Service Contracts								
Wolf Ridge Environmental Learning Center - regional coordination of 20 workshops over 2 years, including design, development, logistics and delivery.				$40,000		$40,000	$40,000	$40,000
Eagle Bluff Environmental Learning Center - regional coordination of 20 workshops over 2 years, including design, development, logistics and delivery.				$40,000		$40,000	$40,000	$40,000
Instructors (3) to present at workshops and provide 10 follow-up cohort tele-training meetings in the metro area				$13,500		$13,500	$13,500	$13,500

Assessment consultant - consulting on design and implementaiton for teacher evaluatoin of online platform and project curriculum	$5,000		$5,000				$5,000	$5,000
Printing								
Curriculum guides for all teachers who complete workshop @ $10 each				$5,263		$5,263	$5,263	$5,263
Travel expenses in Minnesota								
Travel expenses for A Strauss (Citizen Science content expert) to travel 6 trips from Rochester to St. Paul for design meetings and teacher workshops ($100/trip) and one to NE Minnesota for workshop	$500		$500	$500		$500	$1,000	$1,000
COLUMN TOTAL	**$99,614**	**$0**	**$99,614**	**$170,386**	**$0**	**$170,386**	**$270,000**	**$270,000**

Bridging Classroom and Outdoor Learning By Studying Birds

Expanding the Raptor Lab with proven outdoor curriculum to empower teachers…

+



…to implement outdoor environmental learning projects using birds and technology…

...to inspire students to be the next generation of conservationists in Minnesota.