Environment and Natural Resources Trust Fund (ENRTF)
M.L. 2015 Work Plan

Date of Report: 15 October 2014

Date of Next Status Update Report: 1 January, 2016

Date of Work Plan Approval:

Project Completion Date: 30 June 2017

Does this submission include an amendment request? _no_

PROJECT TITLE: Digitization of Historic Gullion Ruffed Grouse Research

Project Manager: Kent Montomery

Organization: Central Lakes College

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Location: Carleton, Mille Lacs, and Crow Wing

Total ENRTF Project Budget:		
	ENRTF Appropriation:	**$75,000**
	Amount Spent:	**$0**
	Balance:	**$75,000**

Legal Citation: M.L. 2015, Chp. 76, Sec. 2, Subd. 03n

Appropriation Language:
$75,000 the first year is from the trust fund to the commissioner of natural resources for an agreement with Central Lakes College to preserve the Gordon Gullion ruffed grouse data sets as permanent digital data files to improve accessibility to the information and inform forest wildlife conservation policies and practices.

I. PROJECT TITLE: Digitization of Historic Gullion Ruffed Grouse Research

II. PROJECT STATEMENT: Prior to his untimely death in 1991, Dr. Gordon W. Gullion was universally recognized as the world's foremost authority on ruffed grouse. Dr. Gullion began his landmark study of ruffed grouse ecology and habitat management in 1958 under the auspices of the University of Minnesota at the Cloquet Forestry Center, the Minnesota Department of Natural Resources Mille Lacs Wildlife Management Area and the privately owned Crow Wing Study Area. Dr. Gullion's efforts followed those of Dr. Ralph King who initiated Ruffed Grouse research at Cloquet in the 1930's at the urging of Aldo Leopold. A gap in research occurred from the late 1930's until the mid-1950's at which time Dr. William H. Marshall re-opened the research efforts which included backtagging of ruffed grouse followed by pioneering research in the use of radio-telemetry to study ruffed grouse movements. The longevity and breadth of this research is unparalleled in the profession.

Over 69,000 individual data records were collected on hard copy edge punched field data forms. These irreplaceable data include records documenting ruffed grouse habitat use throughout the year, food habits, reproductive success and mortality factors that when used in concert, provide an assessment of ruffed grouse ecology that is the very foundation of ruffed grouse habitat and population management throughout much of the range of this important game bird, particularly the Great Lakes region. The forest management strategies designed to sustain habitats for ruffed grouse have been demonstrated equally beneficial to many species of nongame wildlife, including the seriously imperiled golden-winged warbler (petitioned for protection under the federal Endangered Species Act - February 2010).

Unfortunately, the hard copy data forms are slowly deteriorating to the point that if they are not soon converted to a more permanent medium, the information they contain will be lost forever – and with it an important chapter in the history of wildlife conservation in Minnesota. The loss of these data would seriously compromise efforts of today's resource management professionals to gain new insight into ruffed grouse ecology and management using recent statistical procedures unavailable to Gullion and his predecessors.

Also, Dr. Gullion, had at the time of his death, over 50 uncompleted technical papers and one book length manuscript describing his personal 30 years of research on Ruffed Grouse. Conversion of the data to current digital format standards is necessary to efficiently complete these manuscripts and eventually seek to have those published in memory of Dr. Gullion's 30-year research endeavor.

The overall goal of this project will be to preserve the Gullion ruffed grouse and other data sets in a series of two or three phases over the next four to six years to enable natural resource management professionals to take advantage of the wealth of information contained therein to further improve the understanding of ruffed ecology and open possible new avenues of research. This project represents the first phase of the preservation of Gullion's data, targeting approximately one-third of the data cards. Student interns from Central Lakes College will provide data entry and analysis for this project. Approximately 20,000 data cards (one-third of all records) will be entered and analyzed over the course of two academic years. ENRTF funding will be used to leverage Federal Work Study funding for qualified students, providing additional support for data card entry.
A significant potential application for these data is the potential completion of over 50 unpublished manuscripts and Dr. Gullion's personal life's work manuscript pertaining to his research of ruffed grouse over a three decade period.

A second phase of the project would be to complete the entry of the remaining 49,000 data records. These records will also be digitally preserved using student interns at Central Lakes College supported by external funding (ENRTF and/or other sources) coupled with Federal Work Study funding. This data and phase one data would be disseminated through an online data repository at Central Lake College, with digital copies provided to the University of Minnesota, the Minnesota Department of Natural Resources, and the Ruffed Grouse Society. The complete data set, representing over 69,000 cards, includes trapping records, observation records, drumming log

usage data, drumming log ecological data, individual bird records, band code data, feeding records, aspen bud production data, radio telemetry records and other miscellaneous data.

Permanent digital preservation of the data sets in an MS Access data format that can be efficiently analyzed using the latest analytical tools and statistical software to guide the development of forest wildlife conservation policies and practices. Following the entry of the first summer's data, a small number of the most completed manuscripts will be selected to finalize. Data retrieval and analysis methods will be tested using MS Access and MS Excel to test and evaluate the effectiveness of the data entry, compilation and analysis process. The completed manuscripts will be saved for possible future publication as "The Unpublished Ruffed Grouse Research Works of Dr. Gordon Gullion".

III. OVERALL PROJECT STATUS UPDATES:

Project Status as of 1 January 2016:

Project Status as of 1 July 2016:

Project Status as of 1 January 2017:

Project Status as of 1 July 2017:

Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1:
Description: Preserve Data by Converting to Electronic Format. Preserve 20,000 data records currently stored on deteriorating hard copy field forms by converting these data to an electronic Master Data File. Five student interns at Central Lakes College will be employed over two academic periods to enter the data into an MS Access format designed to mimic the data card format. These records will be searchable by word, phrase, date, and numeric content.

Summary Budget Information for Activity 1:

ENRTF Budget: $ 40,601
Amount Spent: $ 0
Balance: $ 40,601

Outcome	Completion Date
1. Archival of Electronic MS Access Data Records; Phase 1	1 Oct. 2016

Activity Status as of 1 January 2016:

Activity Status as of 1 July 2016:

Activity Status as of 1 January 2017:

Final Report Summary:

ACTIVITY 2:
Description: Simplify Data Retrieval to Facilitate Use. Establish subsets of the Master Data File based on ecological, spatial and temporal attributes (e.g. cause of mortality, location, month-year, etc.). Establish

companion subset keys to enable future users to easily and efficiently navigate and retrieve data relevant for the specific analytical task. A conversion key will need to be developed that automatically converts the grid data used to record observation and trapping records to latitude-longitude coordinates. A data conversion routine would be developed to accomplish this whereby specific grid coordinates would be automatically converted and recorded in lat-long data fields in the Access form. Previously mapped locations of drumming logs, trap sites and other fixed location sites have previously been mapped as part of another project and these data would be automatically entered when a fixed feature location was referenced. Two student interns will be selected to work on this task.

Summary Budget Information for Activity 2:

ENRTF Budget: $ 19,806
Amount Spent: $ 0
Balance: $ 19,806

Outcome	Completion Date
1. Archival of Electronic MS Access Data Records; Phase 1	31 Jan. 2017

Activity Status as of 1 January 2016:

Activity Status as of 1 July 2016:

Activity Status as of 1 January 2017:

Activity Status as of 1 July 2017:

Final Report Summary:

ACTIVITY 3:

Description: Examine the uncompleted manuscripts and select a small sample of those that could be completed to test the effectiveness of the data retrieval and analysis process and potential using MS Access and Excel as data management and analysis tools. Other compatible analytical packages may also be considered if shown to be more effective in the analysis process. Two student interns will be selected to work on this task.

Summary Budget Information for Activity 3:

ENRTF Budget: $ 14,593
Amount Spent: $ 0
Balance: $ 14,593

Outcome	Completion Date
1. Archival of Electronic MS Access Data Records; Phase 1	30 June 2017

Activity Status as of 1 January 2016:

Activity Status as of 1 July 2016:

Activity Status as of 1 January 2017:

Activity Status as of 1 July 2017:

Final Report Summary:

V. DISSEMINATION:

Description: Digitally preserved records (Master Data File) will be provided to the University of Minnesota, Minnesota Department of Natural Resources, and the Ruffed Grouse Society for archival and use upon completion of this phase. One copy of the Master Data File (original) will remain at the Natural Resource Program at the Central Lakes College and made available to the public. Each of these data sets will be updated as additional data is compiled (additional phases). Manuscripts completed or prepared from this data will be submitted to peer-review journals for publication. The digital archiving process will be documented and prepared as a technical paper for use by others seeking to preserve historic data sets.

Status as of 1 January 2016:

Status as of 1 July 2016:

Status as of 1 January 2017:

Status as of 1 July 2017:

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

Budget Category	$ Amount	Overview Explanation
Personnel:	$ 59,120	Project Manager (summer wages) 5% FTE over 2 yrs. - $5,663 student workers 5 @ 71% FTE for 11 weeks each of two years +2 @ 25% FTE for 32 weeks + 2 @ 50% FTE for 16.5 weeks - $53,457
Professional/Technical/Service Contracts:	$ 12,500	Project Leader 10% FTE over 2 yrs. - $12,500
Travel Expenses in MN:	$ 3,380	Round trip travel to Brainerd (30 trips @ 200 mi) and Cloquet (2 trips @ 380 mi) from metro to gather data records and coordinate archival
TOTAL ENRTF BUDGET:	**$ 75,000**	

Explanation of Use of Classified Staff: NA

Explanation of Capital Expenditures Greater Than $5,000: NA

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: Approximately 1.4 FTE

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 0.1 FTE

B. Other Funds:

Source of Funds	$ Amount Proposed	$ Amount Spent	Use of Other Funds
State			
Classified staff at Central Lakes College (in-kind)	$6,382		Tracking and reporting budget expenses, managing Work Study students and funding, and processing of payment/purchase orders

Non-state			
Federal Work Study Funding for students (2 students @ 25% FTE for 36 weeks for each of two years)	$13,838	$0	Additional student hours for data entry, enter and analyze geographic data, and to assess unfinished manuscripts for completion.
Ruffed Grouse Society	$17,500	$0	Additional student hours to enter more data cards into digital storage.
TOTAL OTHER FUNDS:	**$ 37,720**	**$0**	

VII. PROJECT STRATEGY:

A. Project Partners: The University of Minnesota will provide access to the remaining records from Gordon Gullion's work for digital preservation. Central Lakes College will serve as an online repository for the digitally preserved data and the Mater Data Files. The University of Minnesota, Minesota Department of Natural Resources, and the Ruffed Grouse Society will be provided with digital copies of the Master Data Files for their use and further dissemination.

B. Project Impact and Long-term Strategy: The preservation of these perishable records will preserve the ruffed grouse and other data sets collected by Gordon Gullion in Cloquet and Mille Lacs Counties. This will enable natural resource management professionals to take advantage of the wealth of information contained therein to further improve the understanding of ruffed ecology and open possible new avenues of research. This project represents the first phase of the preservation of Gullion's data, targeting approximately 20,000 data cards. A significant potential application for these data is the potential completion of over 50 unpublished manuscripts and Dr. Gullion's personal life's work manuscript pertaining to his research of ruffed grouse over a three-decade period. A second phase of the project would be to complete the entry of the remaining 49,000 data records using additional student interns beginning in 2017 with funding provided from outside sources (e.g., ENRTF) and leveraged using Federal Work Study funding. All data will be disseminated using an online data repository managed by Central Lakes College with additional digital copies of the files provided to the University of Minnesota, the Minnesota Department of Natural Resources, and the Ruffed Grouse Society.

C. Funding History:

Funding Source and Use of Funds	Funding Timeframe	$ Amount

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

X. RESEARCH ADDENDUM: na

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than 1 January 2016, 1 July 2016, and 1 January 2017. A final report and associated products will be submitted between June 30 and August 15, 2017.

Environment and Natural Resources Trust Fund
M.L. 2015 Project Budget

Project Title: Enhancing Future Forest Conservation Using Gullion's Historic Research
Legal Citation: M.L. 2015, Chp. 76, Sec. 2, Subd. 03n
Project Manager: Kent Montgomery
Organization: Central Lakes College
M.L. 2015 ENRTF Appropriation: **$** 75,000
Project Length and Completion Date: *2 Years, June 30, 2017*
Date of Report: October 15, 2014

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	Activity 2 Budget	Amount Spent	Activity 2 Balance	Activity 3 Budget	Amount Spent	Activity 3 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	***Preserve Data by Converting to Electronic***			***Simplify Data Retrieval to Facilitate Use***			***Test the effectiveness of the data retrieval***				
Personnel (Wages and Benefits) Overall	$35,721	$0	$35,721	$11,806	$0	$11,806	$11,593	$0	$11,593	$59,120	$59,120
Kent Montgomery, (summer wages) Project Manager, $5,663 - 5% FTE (75% salary 25% benefits) over 2 years											
9 Student Workers: $53,457 (90% salary, 10% benefits): Position 1 - 5 students at 71% FTE for 11 weeks for each of two years, Position 2 - 2 students at 25% FTE for 32 weeks, Position 3 - 2 students at 50% FTE for 16.5 weeks											
Professional/Technical/Service Contracts											
Frank Svoboda, Project Leader, $12,500 - 10% FTE (100% salary) over 2 years	$2,500	$0	$2,500	$7,500	$0	$7,500	$2,500	$0	$2,500	$12,500	$12,500
Travel expenses in Minnesota											
Project Leader round trip travel to Brainerd (30 trips @ 200 mi) and Cloquet (2 trips @ 380 mi) to gather data records and coordinate archival. Mileage: $3,380	$2,380	$0	$2,380	$500	$0	$500	$500	$0	$500	$3,380	$3,380
COLUMN TOTAL	**$40,601**	**$0**	**$40,601**	**$19,806**	**$0**	**$19,806**	**$14,593**	**$0**	**$14,593**	$75,000	$75,000

Field locations of sites where Gordon Gullion conducted his historic ruffed grouse research.