

## Environment and Natural Resources Trust Fund (ENRTF) 2010 Work Program

**Date of Report:** November 24, 2009  
**Date of Next Progress Report:** December 31, 2010  
**Date of Work Program Approval:**  
**Project Completion Date:** June 30, 2013

### I. PROJECT TITLE: Identifying Critical Habitats for Moose in Northeastern Minnesota

**Project Manager:** Ronald A. Moen  
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**Web Site Address:** <http://www.nrri.umn.edu/moose>

**Location:** *Cook, Lake, and St. Louis Counties*

<b>Total ENRTF Project Budget:</b>	<b>ENRTF Budget:</b>	<b>\$ 507,000</b>
	<b>Minus Amount Spent:</b>	<b>\$ 0</b>
	<b>Equal Balance:</b>	<b>\$ 507,000</b>

**Legal Citation:** ML 2010, Chap.[\_\_\_\_], Sec.[\_\_\_\_], Subd.\_\_\_\_.

**Appropriation Language:**

### II. PROJECT SUMMARY AND RESULTS:

Moose are one of Minnesota's most prized wildlife species. In less than 20 years moose in northwestern Minnesota declined from over 4,000 to fewer than 100. The northeastern Minnesota moose population, with over 7,000 moose, may be beginning a similar decline. Higher mortality in radiocollared moose is correlated with warm temperatures. We will use satellite collars to track moose in northeastern Minnesota and collect GPS locations day and night 365 days a year. Specific habitats needed by moose will be identified using the satellite collars. Spatial distribution and availability of habitat types will guide identification of specific sites for enhancement, protection, or acquisition. Development of habitat guidelines will help private and public land managers provide the best possible habitat for moose.

The project is a coordinated effort to determine if it is possible to slow or prevent a decline in the northeastern MN moose population. Public outreach and education will be accomplished with a website that provides information on moose in Minnesota and allows the public to report moose sightings. The Minnesota Zoo will develop an on-site informational kiosk about Minnesota moose and zoo educators will

help develop a curriculum for teacher workshops to be held both at the zoo and at the Boulder Lake Environmental Learning Center near Duluth. We will schedule at least 25 public moose presentations per year. The project combines research and education to increase public understanding of Minnesota moose now and in the future.

**III. PROGRESS SUMMARY AS OF:**

**IV. OUTLINE OF PROJECT RESULTS:**

**RESULT 1:**

**Description:** Identify habitats critical to moose survival in Minnesota. We will use behavioral data and habitats used by moose through the year to develop habitat guidelines for moose in Minnesota. Of urgent importance is the influence of increasing temperatures with climate change on moose mortality. Specific habitat types needed by moose in northeastern Minnesota will be identified. Spatial distribution and availability of habitat types will guide identification of specific sites for enhancement, protection, or acquisition.

**Summary Budget Information for Result 1:**

<b>ENRTF Budget:</b>	<b>\$ 452,000</b>
<b>Amount Spent:</b>	<b>\$ 0</b>
<b>Balance:</b>	<b>\$ 452,000</b>

<b>Deliverable</b>	<b>Completion Date</b>	<b>Budget</b>
1. Draft Moose Habitat Guidelines from daily GPS locations downloaded via Argos	12/31/2011	\$226,000
2. Include activity and temperature data analysis in revised Guidelines (from year 1 data)	06/30/2012	\$67,800
3. Revise Guidelines with year 2 location data	12/31/2012	\$67,800
4. Final product with 2 years of location, activity and temperature data	06/30/2013	\$90,400

**Result Completion Date: June 30, 2013**

**Result Status as of December 31, 2010:**

**Result Status as of June 30, 2011:**

**Result Status as of December 31, 2011:**

**Result Status as of June 30, 2012:**

**Result Status as of December 31, 2012:**

**Final Report Summary:**

## RESULT 2:

**Description:** Education modules on how climate change affects moose. We will use GPS data, activity data from this project, aerial photos, and GIS to develop educational content on how moose (and potentially other species) will be affected by climate change. Content will be used in presentations, curricula, website, and at zoo kiosk. Deliverables will be updated with satellite downloads of locations and recent sightings as appropriate throughout the project.

**Summary Budget Information for Result 2:**

<b>ENRTF Budget:</b>	<b>\$</b>	<b>55,000</b>
<b>Amount Spent:</b>	<b>\$</b>	<b>0</b>
<b>Balance:</b>	<b>\$</b>	<b>55,000</b>

<b>Deliverable</b>	<b>Completion Date</b>	<b>Budget</b>
1. Website development – Moose information and sightings reports	08/01/2010	\$8,250
2. Kiosk development for MN Zoo component	09/30/2010	\$19,250
3. Curricula development for schools at K-12 level	03/31/2011	\$16,500
4. At least 25 presentations/year to the public by team members	06/30/2012	\$11,000

**Result Completion Date: June 30, 2013**

**Result Status as of December 31, 2010:**

**Result Status as of June 30, 2011:**

**Result Status as of December 31, 2011:**

**Result Status as of June 30, 2012:**

**Result Status as of December 31, 2012:**

**Final Report Summary:**

### V. TOTAL ENRTF PROJECT BUDGET:

**Personnel:** \$ 199,864 Salary and Fringe calculated with University of Minnesota Electronic Grants Management System.

Within the UM personnel will be R. Moen as project manager (~41% FTE, Fringe 32%). Moen is on soft money funding and is required to write proposals to pay his salary. Other personnel are a Graduate Research Assistant (identity not known, ~50% FTE, Fringe 44%), a Lab Tech (identity not known, ~25% FTE, Fringe 37%), and several Undergraduate Research Assistants (identity not known, ~15% FTE, Fringe 7%). Personnel effort may be adjusted depending on availability and tasks.

**Contracts: \$ 113,000**

Minnesota Zoo. \$12,000. \$8,000 materials, design, installation of kiosk graphic, \$3,000 curriculum development (5% FTE, Fringe 32%), \$1,000 teacher workshop supplies.

1854 Treaty Authority Resource Management Division. \$20,000. Moose capture, necropsies, outreach presentations (8% FTE, Fringe 16%), \$3996 travel, \$1180 field supplies. The 1854 Treaty Authority is an Inter-Tribal Natural Resource Management Agency that manages the off-reservation hunting, fishing, and gathering rights of the Grand Portage and Bois Forte bands of the Lake Superior Chippewa in the territory ceded under the Treaty of 1854. Personnel to be funded are on soft money funding and proposal funding is required to maintain positions.

Fond du Lac Reservation Resource Management Division. \$9,000. Moose capture, necropsies, outreach presentations. 2% FTE, fringe 16%, \$2664 travel, \$789 field supplies.

Moose capture. \$72,000. Budgeted amount but will be let out for bids. \$1,500/moose, estimated 24 captures.

**Other direct operating costs:**

**Spotter plane.** \$25,000. Needed during capture and for mortality searches (125 hrs \* \$200/hr). We will use DNR or Superior National Forest (SNF) airplanes if available. Costs change from year to year so we have estimated flight time at \$200 / hour. If DNR and SNF planes are not available we will let flight contracts out for bid.

**Argos.** \$40,000. CLS America, Inc. (1441 McCormick Drive, Ste. 1050, Largo, MD 20774, [www.clsamerica.com](http://www.clsamerica.com)) is the American Management Company for the Argos satellite system that will be used to remotely retrieve data from the collars. Due to the specialized nature and U.S. Government restrictions, this is a single source item. Satellite communications are estimated at about \$1,000 / collar / year.

**Capital equipment over \$3,500:**

Sirtrack. \$72,680. GPS-Argos collars with activity counter (20 collars at \$3634)

**Equipment/Tools/Supplies: \$ 26,456**

Field supplies. \$11,000. Moose capture, necropsy supplies, temperature loggers.

Workshop supplies. \$1,000. Items needed for teacher workshops.

Capture drugs. \$5,000. Needed for areas where darting is required (vs. net-gunning).

GIS Lab hourly rate. \$1,000. Hourly rates to use NRRI GIS lab.

Refurbish collars for year 2. \$8,456. Estimated collar refurbishing costs for year 2.

Sirtrack--GPS-Argos collars with activity counter (20 collars at \$3634 each) will be purchased in year 1 and re-used in year 2. These collars will be deployed on moose in the NRTF study area. There are no other collars available that can obtain GPS

locations, activity counts, and temperature per our specifications. We will have 1 year of field deployment of the same collar model in Voyageurs National Park and Grand Portage Indian Reservation before the NRTF project. Residual value of some collars will be low if wolves chew on belting or antenna. Collars may be useable for another year or two if other projects exist (e.g., additional regulatory and project costs associated with use and value include permitting, moose capture, Argos communication) but residual value is hard to quantify at this time.

**Travel:** \$ 30,000. All travel is in state following guidelines.

We have estimated these amounts and they may vary depending on areas where moose are collared, investigating mortalities if they occur during the year, evaluation of habitats used by moose and capture operations. We estimated \$15,000 for field work (mileage, per diem food, and lodging). We have budgeted \$12,000 for Presentations and Teacher workshops. Presentations will be throughout much of the state, and thus will require mileage. We will also need per diem food and lodging when presentations are too far from study site. Teacher workshops will be for presenters, and also some funding for travel by teachers to and from the workshops. Finally, we estimated \$3,000 for travel during development of the kiosk and for developing the teacher training workshops. Because group members are based in the Twin Cities and in northern Minnesota, overnight travel will be required. We will attempt to minimize travel during development through the use of conference calls and electronic communications.

**TOTAL ENRTF PROJECT BUDGET: \$ 507,000**

**Explanation of Capital Expenditures Greater Than \$3,500:** Not Applicable.

## **VI. PROJECT STRATEGY:**

### **A. Project Partners:**

#### Project Partners with Contracts

Michael Schrage, Fond du Lac Resource Management Division (FDL). FDL committed to \$40,000 in-kind match over the 3-year project. FDL will receive \$9,000 over the three year project for moose capture, necropsy assistance, and presentations.

Andrew Edwards, 1854 Treaty Authority (1854). 1854 committed to \$10,000 in-kind match in the first year of the project. Budget planning horizon prevented further commitment. The 1854 contract will receive \$10,000 over the three year project for moose capture, necropsy assistance, and presentations.

Grant Spickelmier, Minnesota Zoo. The Zoo committed to \$8,000 in-kind match in the first year of the project. The Zoo will receive 12,000 over the three year project for Kiosk design and construction, website development, curriculum development, and teacher training workshops

Project Partners without contracts

Dr. Mark Lenarz, MN DNR  
Mark Johnson, MDHA

### **B. Project Impact and Long-term Strategy:**

Moose have great economic and emotional value to Minnesota. The near disappearance of moose from NW MN heightened concern for the NE moose population, and led to the formation of a Moose Advisory Committee (MAC) by the MN DNR at the direction of the Minnesota Legislature. The MAC made several recommendations for moose management and research that are being incorporated into a Moose Management Plan being written by the DNR. Members of the MAC are on this proposal, and will work with the DNR to implement Best Management Practices guidelines.

We will also be reaching the people of Minnesota via multiple pathways. The moose website ([www.nrri.umn.edu/moose](http://www.nrri.umn.edu/moose)) is active and has received over 350 sightings reports in less than 4 months. The zoo kiosk will be viewed by many zoo visitors, and presentations by the PI's to groups will also result in interactions with the public. Curricula development and teacher workshops for K-12 teachers will reach the school audience.

In short, because of the importance of moose to many people in Minnesota, we believe this will be a project that is popular and well-received, especially as we gain results over the next 3 years.

### **C. Other Funds Proposed to be Spent during the Project Period:**

<b>SOURCE OF FUNDS</b>	<b>AMOUNT</b>	<b>Source</b>	<b>Comment</b>
NRRI, UMD	\$8,500	UM	NRRI funds to project manager (~10% FTE)
NRRI, UMD	\$17,000	UM	NRRI funds to project manager (~10% FTE). Pending.
MDHA (3 years)	\$5,000	NGO	Collar purchase or moose capture
In-kind Services:			
MN DNR DFW Forest Wildlife Research Group (3 yrs)	\$25,000	State	Salary and Fringe (~5% FTE) and mileage (est. \$1K / year).
MN DNR DFW Wildlife Health Group (3 yrs)	\$20,000	State	Salary and Fringe (~5% FTE) and mileage (est. \$1K / year).
Fond du Lac Reservation RMD (3 yrs)	\$40,000	Tribal	Salary and Fringe (~9% FTE) and mileage (est. \$2K / year).
Superior National Forest	-----	Federal	Pending. Flight time/Field Housing probable.
1854 Treaty Authority RMD (1 yr)	\$10,000	Tribal	Salary and Fringe (~9% FTE) and mileage (est. \$2K / year).
Minnesota Zoo (1 yr)	\$8,000	State	Salary and Fringe (~10% FTE).
Total	\$133,500		Sum of other funds is about 30% of project (see also Spending History)

### **D. Spending History:**

Prior to and concurrent with the ENRTF project are projects in Voyageurs National Park (~\$300K) and on the Grand Portage Indian Reservation (~\$200K) using same collars

and same experimental design. These projects are stand-alone and independent of the ENRTF project but results from other two projects will strengthen ENRTF results.

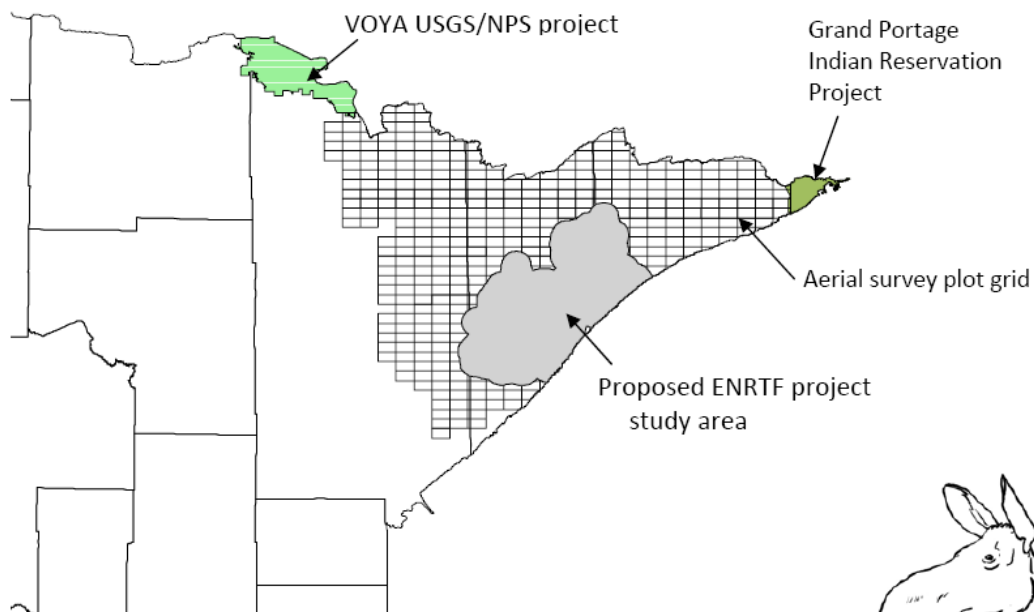
\$5K has been spent by NRRI-UMD (Moen) on website development, temperature measurements, and collar testing.

## VII. DISSEMINATION:

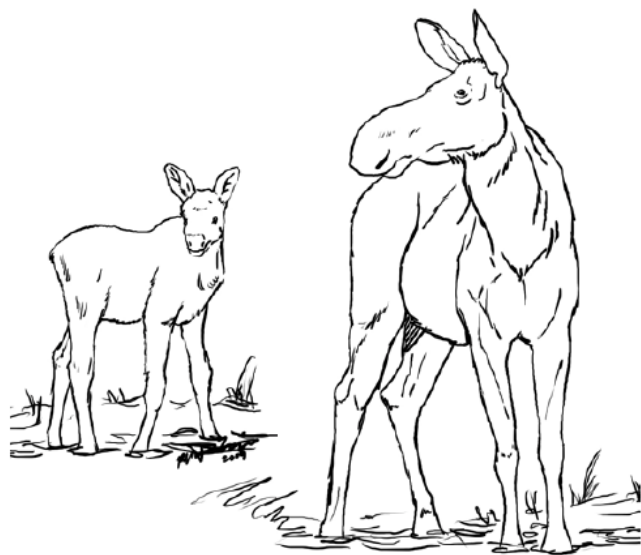
**VIII. REPORTING REQUIREMENTS:** Periodic work program progress reports will be submitted not later than the last day of December 2010, June 2011, December 2011, June 2012, and December 2012. A final work program report and associated products will be submitted between June 30 and August 1, 2013 as requested by the LCCMR.

**IX. RESEARCH PROJECTS:** A Research Addendum has been prepared.

## X. Project Map



Proposed ENRTF GPS collar project study area is based on home ranges of moose in the ongoing VHF collar study. This VHF study in the southern portion of moose range provides baseline data on home range size and mortality from 150 moose with VHF collars. Critical habitat areas will be identified throughout the background grid of aerial survey plots used by the MN DNR for the annual moose survey.



Attachment A: Budget Detail for 2010 Projects - Summary and a Budget page for each partner (if applicable)								
Project Title: Identifying Critical Habitats for Moose in Northeastern Minnesota								
Project Manager Name: Ron Moen								
Trust Fund Appropriation: \$ 507,000								
2010 Trust Fund Budget	Result 1 Budget:	Amount Spent (date)	Balance (date)	Result 2 Budget:	Amount Spent (date)	Balance (date)	TOTAL BUDGET	TOTAL BALANCE
	Identify habitats critical to moose survival in Minnesota			Education modules on how climate change affects moose				
<b>BUDGET ITEM</b>								
<b>PERSONNEL: wages and benefits</b>								
R. Moen (project manager). ~41% FTE, Fringe 32%	102,156	0		14,180	0		116,336	116,336
Grad RA (TBD). ~50% FTE, Fringe 44%	35,927	0					35,927	35,927
Lab Tech (TBD). ~25% FTE, Fringe 37%	34,309	0		6,054	0		40,363	40,363
Undergraduate RA (TBD). ~15% FTE, Fringe 7%	5,472	0		1,766	0		7,238	7,238
<b>Other contracts</b>								
Minnesota Zoo. \$8,000 materials, design, installation of kiosk graphic, \$3,000 curriculum development (5% FTE, Fringe 32%), \$1,000 teacher workshop supplies.				12,000	0		12,000	12,000
1854 Treaty Authority. Moose capture, necropsies, outreach presentations (8% FTE, Fringe 16%), \$3,996 travel, \$1,180 field supplies	17,000	0		3,000	0		20,000	20,000
Fond du Lac Reservation. Moose capture, necropsies, outreach presentations. 2% FTE, fringe 16%, \$2,664 travel, \$789 field supplies.	7,000	0		2,000	0		9,000	9,000
Moose capture. Budgeted amount but will be let out for bids. \$1,500/moose.	72,000	0					72,000	72,000
<b>Other direct operating costs</b>								
Spotter plane during capture/Mort searches (125 hrs * \$200/hr)	25,000	0					25,000	25,000
Argos -- Satellite communications (est. \$1,000 / collar / year)	40,000	0					40,000	40,000
<b>Capital equipment over \$3,500</b>								
GPS-Argos collars with activity counter (20 collars at \$3,634)	72,680	0					72,680	72,680
<b>Supplies (list specific categories)</b>								
Field supplies	11,000	0					11,000	11,000
Workshop supplies				1,000	0		1,000	1,000
Backup supplies (hard disk)	0	0		0	0		0	0
Capture drugs	5,000	0					5,000	5,000
GIS Lab hourly rate	1,000	0					1,000	1,000
Refurbish collars for year 2	8,456	0					8,456	8,456
<b>Travel expenses in Minnesota</b>								
Study site work	15,000	0					15,000	15,000
Presentations/Teacher workshops				12,000	0		12,000	12,000
Kiosk and Workshop Development				3,000	0		3,000	3,000
<b>COLUMN TOTAL</b>	<b>\$452,000</b>	<b>\$0</b>	<b>\$452,000</b>	<b>\$55,000</b>	<b>\$0</b>	<b>\$55,000</b>	<b>\$507,000</b>	<b>\$507,000</b>