

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

Date of Report: 1/28/2010
Date of Next Progress Report: 1/15/2011
Date of Work Program Approval:
Project Completion Date: 6/30/2012

I. PROJECT TITLE: Demonstrating Sustainable Energy Practices at Residential Environmental Learning Centers (RELCs) – Audubon Center of the North Woods (7d-2)

Project Manager: Bryan Wood
Affiliation: MN Coalition of Residential Environmental Learning Centers
Mailing Address: Audubon Center of the North Woods, PO Box 530
City / State / Zip: Sandstone, MN 55072
Telephone Number: Work: 320-245-2648 Cell: 320-290-8246
E-mail Address: bwood@audubon-center.org
Fax Number: 320-245-5272
Web Site Address: www.audubon-center.org

Location: City of Sandstone in Pine County, MN

Total ENRTF Project Budget:	ENRTF Appropriation	\$206,000
	Minus Amount Spent:	\$ 0
	Equal Balance:	\$206,000

Legal Citation: M.L. 2010, Chp. 362, Sec. 2, Subd. 7d2

Appropriation Language:

\$1,500,000 is from the trust fund to the commissioner of natural resources for agreements as follows: \$206,000 with Audubon Center of the North Woods; \$212,000 with Deep Portage Learning Center; \$350,000 with Eagle Bluff Environmental Learning Center; \$258,000 with Laurentian Environmental Learning Center; \$240,000 with Long Lake Conservation Center; and \$234,000 with Wolf Ridge Environmental Learning Center to implement renewable energy, energy efficiency, and energy conservation practices at the facilities. Efforts will include dissemination of related energy education.

II. PROJECT SUMMARY AND RESULTS: Six Residential Environmental Learning Centers (RELCs - Audubon Center, Deep Portage, Eagle Bluff, Laurentian, Long Lake and Wolf Ridge) will reduce their carbon footprints while disseminating energy education that focuses on renewable energy, energy efficiency, and conservation options. The centers, supported by Bush and Butler foundations, chose to invest in a professional energy audit utilizing the engineering and consulting firm McKinstry. The audits evaluated existing buildings, technologies, and energy uses at each centers' location and resulted in state-of-the-art recommendations for conservation and energy efficiency measures, renewable energy possibilities, and demonstration opportunities. Due to the variations of each center's location the suggested solutions represent a

variety of options and make the combined effort important for statewide dissemination. McKinstry's study is the basis for our collective energy investment and education development request.

The Environment and Natural Resources Trust Fund (ENRTF) will allow the Audubon Center of the North Woods (ACNW) to: 1) Improve our energy efficiency and envelope barriers at four of our buildings: Crosby Dormitory, the Dining Hall, Lowry Lodge and Schwyzer Lodge; 2) invest in solar hot-water technology for Crosby Dormitory and the Dining Hall 3) Work in conjunction with the five other RELCs, led by Eagle Bluff, to collectively develop two new lessons on renewable energy technologies and energy conservation based off of our improvements that are applicable to our students' homes, communities and schools. The Audubon Center of the North Woods provides on-site programs for over 8,000 people per year. Since all of our participants will be exposed to the ENRTF applications on campus, the Audubon Center has the potential for educating 80,000 people on these technologies and measures over the next 10 years

Collectively for all six centers, a web consultant will design and construct a website showing each center's energy related information for educational use while providing statewide verification of the engineering and installation results. Eagle Bluff will coordinate the collective efforts of the six centers to achieve Results 2, 3, and 4. The Audubon Center of the North Woods will work collectively with the other centers to develop evaluation, monitoring, and outreach components that can be used by all the centers. This will insure that all users receive consistent messages and information.

III. PROGRESS SUMMARY AS OF: 11/30/2009

IV. OUTLINE OF PROJECT RESULTS:

RESULT/ACTIVITY 1: Implementation of carbon and energy reduction systems for education and demonstration purposes at Audubon Center of the North Woods. Budget \$206,000. Completion Date June 30, 2012.

Description: Established in 1971, the Audubon Center of the North Woods is an RELC located in east-central Minnesota near the town of Sandstone. We have over 4,000 k-12 and college students participate in our programs each year and have over 8,000 total users a year which includes adult and community programs ranging from adventure education, to ecology classes, to cultural and crafts, to energy and sustainability.

Overall, the McKinstry, Inc. report for the Audubon Center of the North Woods showed that all six of our campus buildings need envelope improvements to both conserve energy and improve energy efficiency. Our buildings range in age from 11 to 100+ years in age and major savings in energy can be realized through better insulation and reestablishment of continuous air barriers in these buildings. Because of their positioning, four of the buildings are excellent candidates for solar hot water applications. Upgrades of our existing geothermal heating will make this technology

which heats the main Dining Hall and Dormitory more efficient. Heating upgrades at three of the buildings will also make them more energy efficient.

The targets of our Environment and Natural Resources Trust Fund work plan are to:

- 1) Work with a professional architecture/engineering firm to create a plan for the envelope improvements and domestic solar hot water installation

- 2) Improve the envelope barriers of the Dining Hall/Office building, Crosby Dormitory, and Schwyzer and Lowry Lodge. Our plans are to dramatically increase the envelope barrier protection to a continuous air barrier on these buildings through better insulation in the walls, crawl space and attic, as well as high efficiency windows and doors to keep heat or air conditioning from being lost to the outside. These envelope improvements will greatly lower the amount of energy we need to use by holding inside temperature and keeping the outside temperature from coming in.

- 3) Convert our propane heated water system into solar hot water technology through the installation of solar hot-water panels at the Dining Hall/Office and Crosby Dormitory. The Audubon Center's Dining Hall serves meals for hundreds of participants a day, and our dormitory has 14 rooms that house 114 people total. Each dorm room has two 2 sinks, a toilet and shower. Through the installation of solar hot water technology we will be able to significantly lower our propane use.

The reasons these improvements were chosen from the McKinstry report is because they: 1) have the ability to reduce the Audubon Center of the North Woods' carbon production considerably while improving efficiency, 2) utilize a renewable energy source (solar), and 3) serve as visible demonstrations for educating users on the benefits of energy conservation and efficiency, and renewable energy.

Summary Budget Information for Result/Activity 1:

ENRTF Budget:	\$206,000
Amount Spent:	\$ 0
Balance:	\$206,000

Deliverable/Outcome	Completion Date	Budget	Estimated Carbon Reduction (#s)
1-1 Professional Architecture and Engineering Services to create plan for energy improvements	09/31/10	\$20,000	0
1-2 Install Envelope & Improvements into Crosby Dormitory, Dining Hall, Schwyzer and Lowry	12/31/10	\$116,000	192,338

Lodge			
1-3 Install Domestic Solar Hot-Water for use in Dining Hall and Crosby Dormitory	12/31/10	\$70,000	67,232

Result Completion Date: *June 31, 2012*

Result Status as of 1/15/2011:

Result Status as of 7/15/2011:

Result Status as of 1/15/2012:

Result Status as of 7/15/2012:

Final Report Summary: *7/15/2012*

V. TOTAL ENRTF PROJECT BUDGET:

Contracts: Professional/technical assistance for a design/implementation team \$20,000. The professional contractors will be determined through a competitive bid process.

Supplies: \$0

Capital Improvements: Conservation: Envelope Improvements: \$116,000
 (Estimate of cost: 60% Materials, 40% Installation)
 Renewable: Solar Hot Water \$70,000
 (Estimate of cost: 60% Materials, 40% Installation)

TOTAL ENRTF PROJECT BUDGET: \$206,000

Explanation of Capital Expenditures Greater Than \$3,500: The capital improvements indicated above that are made with these funds are fixed capital assets and will remain in place and will continue to be used for the same program through its useful life.

VI. PROJECT STRATEGY:

A. Project Partners: Audubon Center, Sandstone; Deep Portage, Walker; Eagle Bluff, Lanesboro; Laurentian, Britt; Long Lake, McGregor; and Wolf Ridge, Finland, MN.

B. Project Impact and Long-term Strategy: The RELCs sustainable energy campaign has two phases or main goals. Phase 1 is to retrofit our campuses using conservation, efficiency, and renewable resources to reduce the overall RELC project carbon emissions by 80% and lower energy costs. The ENRTF funds will be used to implement one quarter of the Phase 1 goal and sets the stage for our Phase 2

educational programs. The Audubon Center of the North Woods will continue to seek funds until all of the Phase 1 work identified in the McKinstry report is completed.

Phase 2 is to create and implement education efforts that compliment the building improvements done in Phase 1, thus using the campuses as models for sustainable retrofitting and practical carbon-neutral lifestyles. The Audubon Center currently uses a 3.7 KB wind turbine, two 4x10 ft. solar hot-water panels, a 208 volt 3-phase geothermal heating system and a 7,680 watt solar array to provide electricity, heat and air conditioning to the Crosby Dormitory and Dining Hall. The ENRTF funds will allow us to expand our renewable energy use by introducing more solar hot-water technology to the campus, and also significantly increase the energy conservation and efficiency of five of our buildings.

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

Item	Overall RELC Project	Audubon Center of the North Woods
C1: 2009 Federal Allocation– 5 Northern Centers, pending	\$1,500,000	\$300,000
C2: Continue Project Development – Butler Family Foundation	\$30,000	\$5,000
C3: In-kind Staff	\$30,000	\$5,000
<i>In Process of Applying</i>		
2010 Federal Allocation		\$60,000

D. Spending History:

Item	Overall RELC Project	Audubon Center of the North Woods
D1: Bush Foundation – McKinstry Study	\$176,000	\$29,300
D2: Butler Family Foundation – Project Development	\$30,000	\$5,000

VII. DISSEMINATION:

Overall RELC Project: Information about this project will be disseminated through a collaborative website that will be available to the public for learning about the process and successes of each individual centers projects. The project will also be discussed in all future New Energy Resource Advisor (ERA) training seminars to be held on-site at each center.

The Energy Resource Advisor (ERA) certificate, developed by Winona State University, is a new curriculum designed to accelerate public understanding of energy efficiency, clean energy, carbon emissions, resource conservation, green technologies, and green jobs. This curriculum is the *first of its kind in Minnesota*. It is a non-credit, continuing education course for adults 18 years of age and older, *using online instructional*

technology combined with applied, field experience at one of the six RELCs.

Participants in this class will learn about: a) the basic components of an energy audit, b) small-scale renewable energy including site suitability, system sizing, and financial incentives that are available, c) alternative building and transportation options, d) ways to “green up” the home or business, and e) the field of emerging “green” jobs.

After completing this course, the successful participant may serve as an energy resource advisor and “green” consultant in the community and workplace.

The Audubon Center of the North Woods –The Audubon Center of the North Woods will include project information on our website, in our newsletter, and through articles/press releases in local paper and electronic media. As stated earlier, we will also incorporate these efficiency and renewable energy applications into our two energy lesson plans that educate our users about energy conservation and renewable energy options applicable to their home, communities, and schools. Information about the energy improvements and technologies will be woven into every school stay, so even if that school does not participate in an energy class, they will learn about the technology through other times and activities with ACNW staff.

VIII. REPORTING REQUIREMENTS: Periodic work program progress reports will be submitted not later than 1/15/2011, 7/15/2011, and 1/15/2012. A final work program report and associated products will be submitted between June 30 and August 1, 2012 as requested by the LCCMR.

Attachment A: Budget Detail for 2010 Projects - Summary and a Budget page for each partner (if applicable)					
Project Title: Demonstrating Sustainable Energy Practices at Residential Environmental Learning Centers (RELCs) – Audubon Center of the North Woods (7d-2)					
Project Manager Name: Bryan Wood					
Trust Fund Appropriation: \$ 1,500,000					
2010 Trust Fund Budget	<u>Result 1 Budget:</u>	Amount Spent (date)	Balance (date)	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM					
Contracts					
Professional/technical- <i>Architectural/Engineering Firm to create plan for envelope and solar hot water installation.</i>	20,000			20,000	20,000
Other contracts					
Capital equipment over \$3,500 (list specific items)					
Conservation- <i>Envelope Improvements to Dining Hall, Crosby Dormitory, Schywzer Lodge, Lowry</i>	116,000			116,000	116,000
Renewables- <i>Solar Domestic Hot Water for Dining Hall and Crosby Dormitory. 60% materials,</i>	70,000			70,000	70,000
COLUMN TOTAL	\$206,000	\$0	\$206,000	\$206,000	\$206,000