



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

Date of Report: 5/5/15

Date of Next Status Update Report: 12-31-15

Date of Work Plan Approval:

Project Completion Date: 6/30/2018

Does this submission include an amendment request? NO

PROJECT TITLE:

Project Manager: Victor Krause

Organization: University of Minnesota Duluth, Natural Resources Research Institute

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Location: Twin Cities Metropolitan Area, North Central Minnesota, Duluth

Total ENRTF Project Budget:	ENRTF Appropriation:	\$155,000
	Amount Spent:	\$0
	Balance:	\$155,000

Legal Citation: M.L. 2015, Chp. 76, Sec. 2, Subd. 07c

Appropriation Language:

(c) Building Deconstruction to Reduce Greenhouse Gas Emissions and Solid Waste
\$845,000 the first year is from the trust fund to the commissioner of natural resources for an agreement with Better Futures Minnesota in cooperation with the Northwest Indian Opportunities Industrialization Center and \$155,000 the first year is from the trust fund to the Board of Regents of the University of Minnesota – Duluth for the Natural Resources Research Institute to develop and test a model for implementing building deconstruction and material reuse as a competitive alternative to demolition for the purpose of reducing greenhouse gas emissions, reducing landfill waste, and providing job training.

I. PROJECT TITLE: Building Deconstruction to Reduce Greenhouse Gas Emissions and Solid Waste

II. PROJECT STATEMENT: This project will establish deconstruction as an alternative to demolition and develop viable techniques for reducing greenhouse gas emissions and the amount of reusable building materials buried in landfills. The U.S. EPA estimates that construction and demolition debris is the second largest component of our waste stream, just behind municipal solid waste. Only 20-30 percent of this waste is recycled. One goal for this project is to deconstruct at least 30 buildings over a two year period. We estimate that the environmental impact of this effort is projected to: reduce carbon dioxide (CO₂) emissions by 900 metric tons, reduce the emission of methane gas (CH₄) by 45 tons, conserve the equivalent of 6,400 MMBTUs of energy, and divert 2,600 tons of building material from landfills.

As summarized by The Institute for Local Self-Reliance, deconstruction is the systematic disassembly of a building, with the purpose of recovering valuable materials for reuse or manufacturing into new products. By reducing waste, deconstruction also reduces greenhouse gas emissions and abates the need for new landfills and incinerators. It helps to steer the construction and demolition industry towards sustainability and reuse. It reduces the industry's consumption of virgin materials, helps preserve natural resources, and protects the environment from pollution related to extraction, processing, and disposal of raw materials.

The goals for this project are to: (1) Test and fully develop effective techniques and incentives for deconstructing buildings; (2) Develop and build value-added products and sustainable markets for the range of reusable materials recovered; and, (3) Document the environmental, social, and economic benefits of deconstruction, including reduced greenhouse gas emissions, reduced landfill use, and the reuse of natural resources. These goals will be achieved by: (1) Developing efficient techniques for deconstructing buildings safely; (2) Promoting deconstruction as alternative to demolition and establishing a marketplace for reclaimed materials; (3) Creating and manufacturing products made from reclaimed materials; (4) Calculating the environmental impact of this project and deconstruction work.

This endeavor is a partnership between Better Futures Minnesota (Minneapolis), the Northwest Indian OIC (Bemidji), and the Natural Resources Research Institute (NRRI) at the University of Minnesota Duluth. To advance this project and achieve the outcomes outlined in the work plan, the partners intend to meet monthly via conference call and hold face to face meetings each quarter.

Better Futures will: serve as the project manager; take the lead on testing and refining efficient techniques for taking apart buildings; take the lead on educating Tribal, local, county and State government agencies about the practice and benefits of deconstruction and work with these entities to implement incentives, policies and practices that promote deconstruction as an environmentally beneficial alternative to demolition; deconstruct up to 20 uninhabitable properties in various states of condition; and, work with the NRRI to develop and test products that can be manufactured from reclaimed materials. \$503,397 of the ENRTF appropriation is allocated to cover Better Futures' projected expenses.

The Northwest Indian OIC will: help test and inform the development of efficient techniques for taking apart buildings in North Central Minnesota; hire, train, and supervise NW OIC crew chief and workers; work with Tribal, State, county, and local agencies to implement incentives, policies and practices that promote deconstruction as an environmentally beneficial alternative to demolition; and, deconstruct up to 10 uninhabitable properties in various states of condition. \$341,603 of the ENRTF appropriation is allocated to cover Northwest Indian OIC's projected expenses.

The Natural Resources Research Institute (NRRI) at the University of Minnesota Duluth will: inform the development of techniques that maximize the quality and quantity of materials harvested from buildings that

are in various states of condition and assess the value, quality, and quantity of materials harvested; identify or develop a tool for calculating the yield and environmental impact of materials harvested from buildings, including reduced greenhouse gas emissions, energy savings, reduced landfill use, and the reuse of natural resources; and build prototypes and test products that can be manufactured from reclaimed materials. \$155,000 of the ENRTF appropriation is being appropriated directly to NRRI to cover its projected expenses.

III. OVERALL PROJECT STATUS UPDATES:

Project Status as of 12/31/2015:

Project Status as of 06/30/2016:

Project Status as of 12/31/2016:

Project Status as of 06/30/2017:

Project Status as of 12/31/2017:

Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Develop efficient techniques for deconstructing tribal, publically owned, or uninhabitable buildings safely.

Description:

One key strategy for making deconstruction a cost-effective alternative to demolition is demonstrating viable, safe techniques for dismantling a building. In addition, as proponents of deconstruction, the partners must document the yield, value, and quality of the materials diverted. Accordingly, the tasks and outcomes in this area of activity are aimed at testing and refining techniques for maximizing the yield, quality, and value of material diverted from landfills either through recycling or reuse. The objective of maximizing yield and value of material diverted must be balanced with the cost of time and labor required to meet this objective.

As outlined in their work plan, Better Futures and the NWIOIC will take apart in a methodical manner at least 30 Tribal, publically-owned, or uninhabitable buildings that are in various stages of condition (i.e. fully intact to partially damaged). These projects will be used to continuously refine deconstruction and material processing techniques during the course of this project. Better Futures and NWIOIC will also use the practical experience from these projects to develop and refine protocols that help workers maximize the yield, quality, and value of material harvested from each building. A related task is that partners will test a range of techniques for processing the material harvested to achieve the greatest value from recycling or reuse.

UMD NRRI Work Plan Activities

NRRI will be helping Better Futures and NWIOIC with assessing the value, quality and quantity of materials harvested. Specifically, this includes identifying the materials that are collected during deconstruction and assessing their quality. For wood materials, this would include identifying information about the wood species, the visual grade and the quantity of materials collected. Further, other important material information would be generated including quantities of other building and construction materials collected. An assessment will be conducted to validate value options for these materials based on published information, data collected from other national deconstruction companies, and other third party sources. Mr. Tim Roman from Ecotone Partners GBC, Inc. will participate in this activity under a contract for professional service. He has significant experience in deconstruction.

Summary Budget Information for Activity 1:

ENRTF Budget: \$18,826
Amount Spent: \$ 0
Balance: \$18,826

Outcome	Completion Date
1. NRRI will develop a final report that will provide information on the quality, grade and value of the wood materials and other deconstruction materials based on information collected during the activity. This will include a range of values based on grades, potential end uses and other factors.	June 30, 2017

Project Status as of 12/31/2015:

Project Status as of 06/30/2016:

Project Status as of 12/31/2016:

Project Status as of 06/30/2017:

Project Status as of 12/31/2017:

Final Report Summary:

ACTIVITY 2: Promote deconstruction as a sustainable alternative to demolition and a establish a marketplace for reusing materials harvested from projects

Description:

Another key strategy for making deconstruction a viable alternative to demolition is to introduce the value and benefits of deconstruction to a range of people in the community: homeowners, contractors, demolition companies, architects, Tribal, local, county and state government officials, and consumers. This effort to educate the community and public officials will consist of two objectives: promote the practice of deconstruction as a viable, cost effective alternative to demolition; and, increase awareness about the value and uses for materials harvested from buildings. A combination of information, promotion, and practical demonstrations are expected to generate a trend toward making deconstruction a common practice. In addition, these efforts are expected to increase the amount and types of materials being recycled and reused by consumers, contractors, architects, and government agencies.

As outlined in the Better Futures work plan, the key activities in this area will consist of studying strategies and incentives used by public agencies across the country to promote the practice of deconstruction. In addition, we will study the practices of deconstruction and reuse organizations nationwide to determine their methods for promoting deconstruction and fostering a demand for reclaimed building materials. This scan of practices nationwide will help inform the partner’s efforts in Minnesota. Specifically, Better Futures and the NWIOIC will develop briefing materials outlining the “why, what and how” of deconstruction, including a primer on the environmental benefits of this practice compared to demolition. A strategy for promoting deconstruction within key sectors (homeowners, contractors, architects, demolition companies, and public agency officials) will be developed and implemented. Briefing materials will be tailored for each of these audiences. Outreach tactics

will include making presentations at home improvement shows and conventions sponsored by architects and builders. We will also host seminars and offer presentations for local, county, tribal, and State government officials, focusing on those officials with responsibility for issuing demolition permits and increasing waste recycling rates. The goal of this education and promotion effort is to increase the practice of building deconstruction statewide. In addition, we will work with local, county and State officials to adopt incentives for deconstruction such as reduced permit fees and/or diversion goals for projects.

UMD NRRI Work Plan Activities

NRRI will provide support to the Better Futures and NWOIC in this activity. Specifically, NRRI will identify information on products, quality, and performance of materials that come from deconstruction. We will participate on the study of other deconstruction and reuse organization and support the modification of practices to support this effort in Minnesota. NRRI will develop and present information on these aspects in support of the education and promotion efforts outlined in the Better Futures workplan. This will include information about the environmental benefits and range of potential uses for reclaimed materials will be prepared. This information will be promoted and accessible via each partner’s website.

Summary Budget Information for Activity 2:

ENRTF Budget: \$26,659
Amount Spent: \$ 0
Balance: \$26,659

Outcome	Completion Date
1. NRRI will participate in meetings with Tribal, local, county, and State officials to support the practice of deconstruction and information regarding its environmental benefits. NRRI will provide information for and participate in information and education information booths and seminars at home improvement shows, and trade conventions for architects, contractors, and demolition companies. NRRI will also participate in continuing education sessions regarding the practice and benefits of deconstruction and the reuse of materials are hosted by the partners. Architects and contractors are the prime audience for these sessions.	June 30, 2017

Project Status as of 12/31/2015:

Project Status as of 06/30/2016:

Project Status as of 12/31/2016:

Project Status as of 06/30/2017:

Project Status as of 12/31/2017:

Final Report Summary:

ACTIVITY: 3 Create and test higher value uses for reclaimed materials; develop markets for products made from reclaimed building materials

Description:

UMD NRRI Work Plan Activities

The Natural Resources Research Institute at the University of Minnesota Duluth will identify and test potential products that can be manufactured from reclaimed materials. Specifically, efforts will focus on the

deconstruction materials and their grade/yield identified during Activity 1 of this project. This may include: hardwood and softwood construction lumber, plywood and other wood construction panels, concrete, porcelain, glass, interior furnishings like hardwood lumber and cabinetry. This may include support for reselling the raw materials as deconstructed or using them as a feedstock for new products such as furniture, cabinetry, flooring, landscaping products, or others. An effort will be made to determine suitable product options that can be processed

Prototype samples will be produced and in cooperation with Better Futures and NW OIC they will be presented to potential customers or specifiers in order to gauge realistic market expectations. Performance testing of these products will be conducted.

NRRI will work with Better Futures and Northwest OIC staff to assess the economic market options for these products and work to develop manufacturing processes, standards, specifications, and equipment needed to build products. The NRRI will also offer advice to Better Futures and Northwest OIC staff as they prepare for and begin manufacturing products.

Summary Budget Information for Activity 3:

ENRTF Budget: \$70,585
Amount Spent: \$ 0
Balance: \$70,585

Outcome	Completion Date
1. NRRI will utilize reclaimed deconstruction wood materials to create at least three new products such as end tables, conference tables, and counter tops. Further ideas and prototypes will be generated based on other materials generated during deconstruction.	June 30, 2017
2. Provide support to Better Futures and NWOIC to assess manufacturing and fabrication equipment and production costs for the products developed.	June 30, 2017
3. Provide information to Better Futures and NWOIC on the specification of production equipment, techniques, and standards required for the products.	June 30, 2017

Project Status as of 12/31/2015:

Project Status as of 06/30/2016:

Project Status as of 12/31/2016:

Project Status as of 06/30/2017:

Project Status as of 12/31/2017:

Final Report Summary:

ACTIVITY 4: Calculate the environmental impact of this project and deconstruction work.

Description:

UMD NRRI Work Plan Activities

It is critical to document and report greenhouse gas (GHG) emission reductions from different materials management practices associated with building deconstruction. Further, the team will work to develop information that documents the reductions of the total material removed from the project site was recycled, salvaged, or otherwise diverted from a landfill or incinerator.

The NRRI team will assess the current models being used by Better Futures, including several calculators from the US Environmental Protection Agency (EPA). A detailed review of other models, calculators and formulas will be investigated during the project from private organizations and states and federal agencies. This will include the determination of proper reporting metrics and appropriate environmental benefits. Adaptation and modification of these models will be pursued in order to develop models that accurately reflect the reality of the deconstruction strategy and techniques utilized by Better Futures and NWOIC.

This model will then be used to track and assess the deconstruction projects completed by Better Futures and NWOIC during this project. Individual and cumulative tallies will be completed and reported annually. Several case study examples will be identified and reported. Finally, the NRRI will develop a presentation outlining the results during at least one environmental/green building conference during the project period. Mr. Tim Roman from Ecotone Partners GBC, Inc. will participate in this activity under a contract for professional service. He has significant experience in deconstruction and assessment of environmental benefits associated with deconstruction.

Summary Budget Information for Activity 4:

ENRTF Budget: \$38,930
Amount Spent: \$ 0
Balance: \$38,930

Outcome	Completion Date
1. Identify/modify or develop a tool for calculating the yield and environmental impact of materials harvested from buildings, including reduced greenhouse gas emissions, energy savings, reduced landfill use, and the reuse of natural resources	June 30, 2017
2. Develop several case study examples of environmental impact of building deconstruction and make a presentation at an environmental/green building event in Minnesota	June 30, 2017

Project Status as of 12/31/2015:

Project Status as of 06/30/2016:

Project Status as of 12/31/2016:

Project Status as of 06/30/2017:

Project Status as of 12/31/2017:

Final Report Summary:

V. DISSEMINATION:

Description:

UMD NRRI Work Plan Activities

As noted in the work plan, the NRRI will provide support to Better Futures and NWOIC in the preparation of marketing materials that promote the practice and multiple benefits of building deconstruction. These materials will focus on informing homeowners, architects, contractors, tribal governments, and government agencies (with a focus on North Central Minnesota and the Twin Cities). The partners also intend to identify key

gatherings such as trade shows, industry conventions, and the State Fair to promote the practice of deconstruction and the reuse of used materials. NRRI will participate in these events to help demonstrate the positive reuse of building deconstruction materials and the environmental and economic impacts of the project activities. NRRI will also feature regular updates about the purpose and status of this project through its website (www.nrri.umn.edu), newsletters (NRRI Now) and social media presence.

Project Status as of 12/31/2015:

Project Status as of 06/30/2016:

Project Status as of 12/31/2016:

Project Status as of 06/30/2017:

Project Status as of 12/31/2017:

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

Budget Category	\$ Amount	Overview Explanation
Personnel:	\$ 124,870	PI, Scientist 1 (V. Krause): \$43,697 (79.2% salary, 20.8% benefits), 30% FTE for 2 years Scientist 2 (S. Johnson): \$13,318 (79.2% salary, 20.8% benefits), 10% FTE for 2 years Coordinator (T. Hagen):): \$11,409 (74.7% salary, 25.3% benefits), 5% FTE for 2 years Junior Scientist (R. Hueffmeier): \$17,894 (79.2% salary, 20.8% benefits), 20% FTE for 2 years Technician (R. Vatalaro): \$27,813 (79.2% salary, 20.8% benefits), 18% FTE for 2 years Undergraduate student (1 student): \$10,739 (100% salary 0.0% fringe), 19% FTE for 2 years
Professional/Technical/Service Contracts:	\$20,300	Consultant, Ecotone Partners GBC, Inc.
Equipment/Tools/Supplies:	\$3,376	General woodworking supplies, saw blades, adhesives, wood finishes, cutting bits, stains, hardware,
Capital Expenditures over \$5,000:	\$	
Fee Title Acquisition:	\$	
Easement Acquisition:	\$	
Professional Services for Acquisition:	\$	
Printing:	\$	
Travel Expenses in MN:	\$4,831	Travel to Minneapolis and Bemidji area for project activities associated with deconstruction

		of buildings. Mileage: \$2,565 (10 trips to MSP, 5 to Bemidji); Lodging: \$1,240 (20 nights); and Meals: \$960 (20 days)
Other:	\$1,623	
TOTAL ENRTF BUDGET:	\$155,000	

Explanation of Use of Classified Staff:

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

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 1.0

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 0.15

B. Other Funds:

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
Non-state			
	\$	\$	
State			
	\$	\$	
TOTAL OTHER FUNDS:	\$	\$	

VII. PROJECT STRATEGY:

A. Project Partners:

This endeavor is a partnership between Better Futures Minnesota (Minneapolis) and the Northwest Indian OIC (Bemidji). Better Futures will serve as the project manager. Both agencies are committed to supporting at risk adults who are committed to changing their lives and lifestyles. Job creation and employment are core activities for both. For the past four years, Better Futures has been working with counties, contractors, and the MPCA to promote the practice of building deconstruction and develop markets and alternative uses for construction waste diverted from landfills. Their experience informs the proposal outlined in this work plan. Better Futures is partnering with the Northwest OIC to help build their capacity to provide this service in North Central Minnesota. The University of Minnesota Duluth’s Natural Resources Research Institute (NRRI) recently began working with Better Futures to identify, prototype and assess uses for reclaimed materials. This grant will enable NRRI to increase their level of research and assistance for both Better Futures and the Northwest Indian OIC.

The following is a summary of each partner’s role and responsibilities during this project. To advance this plan and achieve the outcomes outlined in the plan, the partners intend to meet monthly via conference call and hold face-to-face meetings each quarter.

Better Futures Minnesota:

1. Serve as Project Manager with overall responsibility for:
 - A. Preparing LCCMR work plan and budget and submitting status and final reports to the LCCMR
 - B. Organizing and shepherding the partnership, including managing contracts with each partner, establishing and monitoring work plans with each partner, and hosting monthly video meetings and quarterly face-to-face meetings with partners.
2. Take the lead on testing and refining efficient techniques for taking apart buildings
3. Develop, disseminate and update as needed operating manuals and protocols to maximize the amount of material recovered from deconstruction properties and diverted from landfills;

4. Develop, disseminate, and update as needed a training regimen related to safety, product identification, and harvesting techniques to maximize the yield, value and quality of materials from deconstruction properties
5. Hire, train, and supervise Better Futures crew chiefs and workers
6. Assist NRRI with assessing the quality, quantity, and value of materials harvested during the deconstruction process
7. Assist NRRI with developing strategies that maximize quality and quantity of materials harvested from buildings in various states of condition
8. With advice and assistance from NRRI and the Northwest Indian OIC, develop marketing handouts and implement a statewide promotion strategy targeting homeowners, architects, contractors and government agencies
9. With advice and assistance from NRRI and the Northwest Indian OIC, develop expertise for valuing and selling materials using on-line stores and auctions
10. Take the lead on recommending strategies for sustaining the practice of deconstruction statewide
11. With the NRRI and the Northwest Indian OIC, promote deconstruction services and materials, and the environmental benefits of this approach through relations with trade groups, trade shows, social media, and web pages
12. Assist NRRI with studying model deconstruction/diversion policies from across the country; take the lead on drafting model policy and practice options for Tribal, local, county and State government agencies to consider
13. Work with Tribal, State, county, and local agencies to implement public policies and practices that promote deconstruction as an environmentally beneficial alternative to demolition
14. Deconstruct up to 20 properties in various states of condition
15. Work with the NRRI to develop and test products that can be manufactured from reclaimed materials
16. Prepare an operating and financial plan to launch the manufacture of at least three products from deconstruction reclaimed materials. This plan may result in products being made by Better Futures or NW OIC independently or in cooperation with each other.

Natural Resources Research Institute at the University of Minnesota Duluth:

1. Assess the quality, quantity, type, and value of materials harvested during the deconstruction process
2. Develop strategies that maximize the quality and quantity of materials harvested from buildings that are in various states of condition and assess the value, quality, and quantity of materials harvested
3. Study similar endeavors across the nation (i.e. their techniques, products, and the policies that support these techniques and products) with an emphasis on integrating the values and traditions of the Native American and African American cultures
4. Build prototypes and test products that can be manufactured from reclaimed materials
5. Review and test prototypes with potential customers; identify viable products
6. Develop manufacturing plan, identify equipment, and provide technical support, product specifications and quality assurance for each viable product in cooperation with Better Futures MN and NW Indian OIC.
7. Identify or develop a tool for calculating the yield and environmental impact of materials harvested from buildings, including reduced greenhouse gas emissions, energy savings, reduced landfill use, and the reuse of natural resources

Northwest Indian OIC

1. Help test and inform the development of efficient techniques for taking apart buildings
2. Contribute to the drafting and updates of operating manuals and protocols related to material recovery and waste diversion;
3. Assist with drafting and training regimens related to safety, product identification, and harvesting techniques
4. Hire, train, and supervise NW OIC crew chief and workers

5. Assist NRRI with assessing the quality, quantity, and value of materials harvested during the deconstruction process
6. Assist NRRI with developing techniques that maximize quality and quantity of materials harvested from buildings in various states of condition
7. Assist with drafting a business and financial plan for sustaining this enterprise when start up funding, including the LCCMR funding ends
8. Assist NRRI with studying model deconstruction/diversion policies from across the country; take the lead on drafting model policy and practice options for Tribal, local, county and State government agencies to consider
9. Work with Tribal, State, county, and local agencies to implement public policies and practices that promote deconstruction as an environmentally beneficial alternative to demolition
10. Deconstruct up to 10 properties in various states of condition
11. Work with the Natural Resources Research Institute to develop and test products that can be manufactured from reclaimed materials
12. Prepare an operating and financial plan to launch the manufacture of at least three products from deconstruction reclaimed materials. This plan may result in products being made by Better Futures or NW OIC independently or in cooperation with each other.

B. Project Impact and Long-term Strategy:

By adopting deconstruction on a broad-scale, Minnesota can achieve significant reductions in greenhouse gas emissions, reduce the amount of waste buried in landfills, and increase the amount of materials reused. There are, however, a set of challenges that hinder the development of deconstruction into a standard practice statewide. These include:

1. At present, there is no economic model to support this line of work. The cost of dumping in Minnesota is much cheaper than recycling and reuse and there are no established marketplaces for selling reclaimed materials. A new economic model must be developed and changes in public policy and practice are the main drivers for helping to foster this new model.
2. Local and State government is presently focused on the lowest bid to remove buildings and there is no current policy or incentives to take into account the additional jobs and environmental benefits that would be achieved from deconstruction.
3. Launching a new line of business and reaching a level of stability takes time (at least five years) and sufficient startup capital.
4. The State is an under-developed market for deconstruction, meaning that no one is offering this service, there is no prominent marketplace for selling used or reclaimed materials, and current public policy undermines attempts to develop the market more fully. This is both a challenge and an opportunity.
5. At present, there is only one appraiser who is willing to provide private owners with an appraisal for the goods donated to Better Futures. And this appraiser has very limited experience with the method for appraising harvested materials and complying with IRS policies.

This project is focused on addressing these challenges. The four activities being funded over the two year grant period: (1) Developing efficient techniques for deconstructing buildings safely; (2) Marketing deconstruction and establishing a marketplace for selling reclaimed materials; (3) Creating, manufacturing, and marketing products made from reclaimed materials; (4) Calculating the environmental impact of this project and deconstruction work; are formulated to demonstrate the economic, social and economic value of deconstruction. In addition, the partner's experience gained and data generated will help inform the development of policies and practices to support deconstruction as an alternative to demolition. These new policies and practices will also help foster a marketplace for the reuse and reclamation of used building reused materials. And the experience and data will help inform strategies to support deconstruction as a financially viable practice statewide. Long term, deconstruction can become a financially sustainable line of business once the level of work generates adequate revenue from dismantling buildings, selling used materials, and selling products manufactured from reclaimed materials.

C. Funding History:

Funding Source and Use of Funds	Funding Timeframe	\$ Amount
		\$
		\$

IX. VISUAL COMPONENT or MAP(S):

X. RESEARCH ADDENDUM:

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than: December 31, 2015; June 30, 2016; December 31, 2016; June 30, 2017; and December 30, 2017. A final report and associated products will be submitted no later than August 31, 2018.



Project Title: Building Deconstruction to Reduce Greenhouse Gas Emissions and Solid Waste
Legal Citation: Fill in your project's legal citation from the appropriation language - this will occur after the 2015 legislative session.
Project Manager: Victor Krause
Organization: Regents of the University of Minnesota, University of Minnesota Duluth Natural Resources Research Institute
M.L. 2015 ENRTF Appropriation: \$155,000
Project Length and Completion Date: 3 Years, June 30, 2018
Date of Report: Fill in the date of report submission (this will be updated for each status update report)

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	Activity 4 Budget	Amount Spent	Activity 4 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	Develop efficient techniques for deconstructing tribal and publically-owned buildings			Promote deconstruction as a sustainable alternative to demolition and establish a marketplace for reusing materials harvested from projects			Create and test higher value uses for reclaimed materials; develop markets for products made from reclaimed building materials.			Calculate the environmental impact of this project and deconstruction work.				
Personnel (Wages and Benefits)	\$13,736	\$0	\$13,736	\$24,974	\$0	\$24,974	\$62,125	\$0	\$62,125	\$24,035	\$0	\$24,035	\$124,870	\$124,870
PI, Scientist 1 (V. Krause): \$43,697 (79.2% salary, 20.8% benefits), 30% FTE for 2 years														
Scientist 2 (S. Johnson): \$13,318 (79.2% salary, 20.8% benefits), 10% FTE for 2 years														
Coordinator (T. Hagen): \$11,409 (74.7% salary, 25.3% benefits), 5% FTE for 2 years														
Junior Scientist (R. Hueffmeier): \$17,894 (79.2% salary, 20.8% benefits), 20% FTE for 2 years														
Technician (R. Vatalaro): \$27,813 (79.2% salary, 20.8% benefits), 18% FTE for 2 years														
Undergraduate student (1 student): \$10,739 (100% salary 0.0% fringe), 19% FTE for 2 years														
Professional/Technical/Service Contracts														
Consultant, Ecotone Partners GBC, Inc.	\$3,500	\$0	\$3,500	\$0	\$0	\$0	\$2,500	\$0	\$2,500	\$14,300	\$0	\$14,300	\$20,300	\$20,300
Equipment/Tools/Supplies	\$0	\$0	\$0	\$690	\$0	\$690	\$2,686	\$0	\$2,686	\$0	\$0	\$0	\$3,376	\$3,376
General woodworking supplies, saw blades, adhesives, wood finishes, cutting bits, stains, hardware,														
Capital Expenditures Over \$5,000														
List specific items - one row per item. Add rows as needed.														
Fee Title Acquisition														
Specify an estimated number of parcels and acreage and who will hold the title to the land(s) acquired.														
Easement Acquisition														
Specify an estimated number of parcels and acreage and who will hold the easement for the land(s) acquired.														
Professional Services for Acquisition														
List costs associated with fee title and easement acquisition transactions. Indicate expected number of transactions and average costs per transaction.														
Printing														
List types of printing costs anticipated.														
Travel expenses in Minnesota														
Travel to Minneapolis and Bemidji area for project activities associated with deconstruction of buildings. Mileage: \$2,565 (10 trips to MSP, 5 to Bemidji); Lodging: \$1,240 (20 nights); and Meals: \$960 (20 days)	\$1,190	\$0	\$1,190	\$595	\$0	\$595	\$2,451	\$0	\$2,451	\$595	\$0	\$595	\$4,831	\$4,831
Other														
Shipping of samples and prototypes	\$50	\$0	\$50	\$50	\$0	\$50	\$103	\$0	\$103	\$0	\$0	\$0	\$203	\$203
Laboratory testing of energy content of wood samples	\$125	\$0	\$125	\$125	\$0	\$125	\$257	\$0	\$257	\$0	\$0	\$0	\$507	\$507
Grinding of wood materials that are not usable in sold form by a commercial wood grinding company	\$225	\$0	\$225	\$225	\$0	\$225	\$463	\$0	\$463	\$0	\$0	\$0	\$913	\$913
COLUMN TOTAL	\$18,826			\$26,659			\$70,585			\$38,930			\$155,000	\$155,000

