WCS Climate Adaptation Fund 2014

Section I. **APPLICATION COVER PAGE**

Organization Information

Organization name: Sustainable Resources Institute, Inc. (SRI)

Address: 1353 W Highway US 2, Ste. 2

City: Crystal Falls State: MI Zip: 49920

Organization EIN (Employer Identification Number): 20-2185926

Executive Director: Don Peterson

Project Director: Don Peterson Title: Executive Director

Telephone: 906-875-3720 E-mail address: sri_dpeterson@sbcglobal.net

Web address: www.sustainableinc.org

Alternate contact (name, email, phone): Kari Divine, kari@sustainableinc.org

Organizational budget this year: $199,000.00

Provide a summary of your organization's history, goals and current objectives (no more than 2 lines):

The Sustainable Resources Institute, established in 2004, works to increase the use of environmentally friendly and sustainable techniques for multiple-use forest management and production of forest products.

Project Information

Project Title: Climate-Informed Scrub Oak Restoration on the Florence County Forest, Wisconsin

Amount requested: $140,000

Project budget: $280,000 Project start date: 10/1/2014 End date: 9/30/16

Summarize your project (no more than 3 lines):

Demonstration of climate-informed restoration activities on approximately 400 acres of degraded scrub oak forest, while enhancing habitat for a variety of wildlife species. Tree planting and soil amendment adaptation techniques will be implemented as a pilot for similarly affected landscapes.

WCS Climate Adaptation Fund
2014 Full Proposal Application Form

Section II. ABSTRACT

Write a short 2-3 paragraph summary of your project and request to the Wildlife Conservation Society.

This project will take place on approximately 400 acres of the Florence County Forest located in Florence County, Wisconsin which borders the Upper Peninsula of Michigan and is located half way between Lakes Superior and Michigan. All of Florence County is part of the Menominee River Basin which is part of the Lake Michigan Watershed. Forests in this part of the state provide habitat for approximately 18 bird species and 9 mammal species of Greatest Conservation Need in accordance with the Wisconsin Wildlife Action Plan (WI DNR, 2005).

This project is designed to mitigate the impacts of climate change on approximately 400 acres of scrub oak forest. The stands included in the project area have already experienced significant (90%) mortality due to a combination of drought and other factors, and these stressors are expected to become more intense in the future. This project will involve planting a wide variety of tree species that are projected to be favored under a range of future climates. Additionally, the project will provide a first-ever demonstration of soil amendment with wood ash and biochar in a forest ecosystem in the region. Monitoring of the implemented actions will provide valuable information on what could be done on similar sites in the future to successfully adapt to climate change.

Section 8 of this application shows the impressive list of partners involved in this project. Sustainable Resources Institute has garnered support from county, state, and federal agencies, academic institutions, professional associations, and private businesses. This network of partners will help multiply the exposure of the project and communicate the outcomes to a diversity of stakeholders.

Section III. **PROPOSAL NARRATIVE**

1. Geography

In what area, state(s), or region will your project be conducted?
This project will be conducted in Florence County, Wisconsin. The stands selected for this project are representative of an ongoing issue that the County and neighboring landowners are currently facing – scrub oak forests on sandy, nutrient-poor sites that have experienced significant (90%) mortality in recent years.

Site treatment rationale is based on using a mix of differing treatments (no soil amendment, wood ash amendment, and biochar amendment) on sites with different historical harvest regimes. Stand locations, their historical harvest regimes, and predominant species planting are identified in Figure 1 attached to the proposal. The stands are identified as jack pine or red pine, as these are the predominant species to be planted in those stands. Additional species will be planted within the stands to provide diversity as further detailed in the Climate Adaption Section. Descriptions of the stands are outlined in Table 1.

Table 1. Stand Descriptions[1]

Stand	Acreage	Timber Type	Harvest History	Challenges & Opportunities
1	29	Scrub oak with low quality red oak and red maple	Site had been previously thinned. Whole-tree harvested in 2013.	Significant scrub oak dieback, while the red oak seem to be persisting.
2	113	Scrub oak with aspen and red maple	Trees were harvested to a 4" top in 2013.	Retained healthy red oak and scrub oak for future seed trees.
3	55	Scrub oak	Trees were harvested to a 4" top in 2009 and firewood was cut down to a smaller diameter.	Aerial seeded to jack pine and a mix of warm-season grasses in 2009 after site preparation with a power trencher. Little to no regeneration from seeds was observed.
4	41	Scrub oak	Trees were harvested to a 4" top in 2010.	Prepped for planting with power disc trenched and planted with red pine in 2011. Little to no survival.
5	18	Scrub oak with low quality red oak, aspen, and red maple	Whole-tree harvest in 2013.	Significant scrub oak dieback in the, while the red oak seem to be persisting.
6	45	Scrub oak with low quality red oak, aspen, and red maple	Whole-tree harvest in 2013.	Significant scrub oak dieback in the, while the red oak seem to be persisting.
7	37	Scrub oak with aspen and red maple	Harvested to a 4" top in 2013.	Retained healthy red oak and scrub oak for future seed trees. Pockets of natural aspen regeneration will be maintained.
8	44	Scrub oak	Whole-tree harvest completed in 2011.	Prepped for planting with power disc trencher and planted with red pine in 2012. Little to no survival.

2. Climate adaptation science

[1] Harvest regimes are defined by what portion of the trees were removed during the most recent harvest. Whole-tree harvest involves harvesting the portion of the tree that has at least a four-inch diameter, piling the remaining tree tops with less than a four-inch diameter, and chipping the tops. The chips are then removed from the site. Whole-tree harvest removes the many nutrients from the stand, potentially impacting the long-term soil productivity of the site by reducing the nutrient availability to future stands. Harvest of round wood only leaves the tops on the site where they eventually decompose, returning nutrients to the soil and thereby sustaining its productivity.

a) Describe the relevant climate science for your project area. What impacts are projected? To what degree are your project's focal ecosystems expected to be vulnerable to changes in climate and other environmental conditions? How might climate change impacts affect your ability to achieve conservation goals for your focal ecosystems and species?
b) Tell us how the proposed work will help achieve conservation goals for the focal system in light of climate change, based on the science referenced above. Explain the process by which you determined that the actions proposed are likely to be the most effective interventions for adaptation at your site or landscape. Clearly connect the dots between the applicable climate science, your conservation goals and your proposed actions. **Tell us what you are doing differently because of climate change.**

The primary goal of this project is to meet the forest management objectives of Florence County while adapting to expected climate change impacts. Florence County's goal for management of county-administered lands is to manage for multiple uses, including watershed protection, maintaining plant and animal diversity, providing recreational opportunities, and producing raw materials for forest industries. Conventional management of scrub oak forest in northern Wisconsin is to clearcut at 70 years of age and regenerate the oak species through stump sprouting. Due to recent mortality of the oak species due to a combination of climate change (temperature and drought), oak wilt, and forest pests, the stands in this project area can no longer be regenerated in this fashion and they are at risk of converting to a non-forested condition. In order to maintain forest cover in this area and ensure that the county can continue to meet their overarching management goals, an aggressive site preparation/planting project is proposed. Project partners developed these ideas using the Forest Adaptation Resources adaptation workbook process to evaluate management goals and select adaptation actions (Swanston and Janowiak 2012). Staff from SRI, Florence County, and the Northern Institute of Applied Climate Science (NIACS) worked together to develop the rationale and adaptation tactics for the project.

Below, we summarize the relevant climate change science and adaptation actions for the project. We focus on two major anticipated climate change impacts that will affect the project area in coming decades, along with a range of proposed adaptation actions that will address these impacts.

Climate Impact: Habitat shifts for key tree species

In Northern Wisconsin, future projections of climate impacts are provided by two comprehensive climate change vulnerability assessments for forest ecosystems, which rely on multiple forest impact models, a range of future climate scenarios, and local manager expertise (Swanston et al. 2011, Janowiak et al. In press). Project partners discussed the regional climate projections (see below) and used them as a starting point to determine our expectations for particular species within the project area. Importantly, the project area features deep, sandy glacial outwash soils (Sarona-Vilas Complex), which are droughty, nutrient-poor, and prone to disturbance.

Scrub oak and northern red oak, two dominant species in the project area, are already in decline due to a combination of recent drought and forest pest outbreaks. Under the range of anticipated climate scenarios, we anticipate that these species are likely to decline in the project area. Alternatively, other species within the surrounding landscape and further south in Wisconsin are anticipated to be favored under the range of future climate conditions. Given that the soils in the project area will be unsuitable for many tree species that require mesic, nutrient-rich habitats, we were able to refine the list of projected increasing species to select only those species that might tolerate the conditions in the project area. Tree species projected to decline are scrub oak, northern pin oak, and quaking aspen; tree species projected to increase include jack pine, red pine, white pine, bur oak, and swamp white oak (selected from Janowiak et al. In press).

Adaptation Action: Species selection and planting

Five tree species projected to be favored under a climate change will be planted in the project area (jack pine, red pine, white pine, bur oak, and swamp white oak). Jack pine, red pine, and bur oak are all tolerant of moisture stress (Burns and Honkala 1990). White pine can tolerate a wide range of soil moisture conditions, and is an appropriate long-lived conifer to plant in both upland and riparian settings. Swamp white oak is predicted to have a northern expansion of its range and will be planted in riparian areas. Healthy pockets of scrub oak & northern red oak will be identified and reserved. This will help maintain these species on the landscape and offer the opportunity for future regeneration. Subsequent management of the oak will be thinning when density reaches appropriate levels and regeneration harvests when individual stands are between 65 and 85 years of age.

Pine species will be planted on the upland portions of the project area to create a pine/oak mosaic. These species are already present in the surrounding landscape, and we expect they will be well-suited to the soils and anticipated future climate in the project area. Jack pine will be the primary species planted, as it is best-suited to tolerate droughty conditions in the project area. A young cohort of jack pine may also provide valuable Kirtland's warbler habitat. Converting these sites to a pine/oak mix is a significant departure from the conventional management approach, but may offer the greatest likelihood of sustaining forest cover in the project landscape. Jack pine plantings are typically not thinned and a regeneration harvest is done at 45 years of age. Where there are blocks of jack pine larger than 40 acres, the regeneration harvest will be staggered with two or more harvests at least five years apart (ie. 75 acres of jack pine plantation, 25 acres at 43, 48 and 53 years of age.) Red pine plantations are typically thinned at twenty-five years of age and every eight to ten years thereafter until a final harvest at 80 to 90 years of age.

Bur oak and juneberry will be planted in clusters in the upland portions of the project area to provide mast crops for wildlife species, replacing declining oak species. Both species are present in the surrounding landscape, and we expect they would be well-suited to the soils and anticipated future climate in the project area. These species will provide important mast sources for a variety of wildlife species, and are not typically planted in conventional forestry operations. These tree species, along with the swamp white oak listed below, will be left for mast productions. Also, efforts will be made to encourage regeneration of seedlings around the older established trees by incorporating soil disturbance activities in conjunction with other management activities in adjoining stands.

Small areas of white pine and swamp white oak will be planted along riparian corridors in the project area to maintain long-lived forest cover and wildlife corridors. The current range of swamp white oak extends just to the south of the project area (Burns and Honkala 1990).

Climate Impact: More frequent soil moisture stress and droughts

Information on anticipated climate change for northern Wisconsin has been summarized in several climate change vulnerability assessments (Swanston et al. 2011, Janowiak et al. In press, WICCI 2011). Northern Wisconsin's climate is projected to be 3-9 °F warmer by the end of the century, according to a range of future climate scenarios. Warmer temperatures are expected to advance the timing of spring snowmelt and extend the growing season from 1 to 2 months by the end of the century. Additionally, warmer temperatures will increase evapotranspiration throughout the growing season, leading to net drier conditions in summer months.

Total annual precipitation is generally projected to increase slightly, but most of this increase is projected to come in winter and spring. Additionally, there has been a sharp increase in heavy precipitation events (+3 in. in a single rainstorm) over the last 60 years, a trend which is expected to continue (Saunders 2012,

Kunkel et al. 2013). Depending on soils and topography, much of the precipitation in these heavy rainfall events may not be useful for forests if it cannot be absorbed into the soil profile.

These projections suggest that forests in northern Wisconsin may be exposed to warmer conditions and more moisture stress under climate change. Landscapes such as the project area that are already marginal for forests may be at greater risk of losing forest cover altogether.

Adaptation Action: Wood ash and biochar soil amendments

Given that one of Florence County's primary objectives for the project is to maintain forest cover on the landscape, the tree species decisions (above) are designed with drought tolerance in mind. This project will also implement soil amendments of biochar and wood ash in selected areas. Soil amendments have been used in forest ecosystems in the western US, and recently they have been used in agricultural settings in the Great Lakes region. Biochar and wood ash have been demonstrated to reduce bulk density, increase soil water-holding capacity, provide additional nutrient exchange sites, and enhance soil microbial communities (Coleman et al. 2010, Dumroese et al. 2011, McElligott et al. 2011).

Wood-based soil amendments have never been used on the Florence County Forest, nor to our knowledge in a forest setting in the Great Lakes region. This action has high potential as a climate change adaptation action because it may be a direct means to improve the ability of a forest to tolerate increased drought stress, particularly in a sandy soil with naturally low water-holding capacity. The additional nutrient-related effects of wood ash and biochar may prove to maintain the productivity of the project sites, which would also help Florence County continue to achieve their goal of producing a sustainable supply of wood fiber and a forested habitat for a wide variety of wildlife.

The nearby Verso Paper Mill in Quinnesec, MI, has expressed interest in providing a source of soil amendment material and partnering on this project. Soil amendment areas will be monitored over time to demonstrate the effect on tree growth and drought susceptibility. They have already done considerable work with applying ash to agricultural fields; however, this will be the first forest application that they will have done.

3. Activities and Timeline

Provide a list of the specific activities you propose and a timeline for their implementation.

Timeline (Month/Year)	Activities
10/14	Order trees to be planted.
10/14	Request bids for site preparation work and award a contract.
10/14	Perform baseline soil testing.
10/14 & ongoing	Identify photo monitoring points throughout the 400 acres and take photos after site preparation, plantings, and every August.
11/14	Apply wood ash additives to the soil at identified locations.
2/15	Request bids for tree planting and award a contract.
5/15	Plant trees and apply biochar additives at identified locations.
6/15	Develop a presentation describing the project and desired outcomes.
6/15 & ongoing	Develop a report, articles, and outreach presentation; conduct presentations and publish articles, and post information online.
9/15	Conduct survival studies and soil sampling, and identify areas to be replanted in 2016.
10/15	Order trees.
2/16	Contract with planting crew.
5/16	Replant areas with poor survival.
9/16 & ongoing	Conduct survival studies and soil sampling.

4. Anticipated Outcomes

Please use the table below to organize your response.

Deliverables under the term of this grant [maximum 2 years]	**Expected near-term conservation outcomes [3-10 years]**	**Expected long-term adaptation goal [10-50 years]**
• Restore ~400 acres of former (90% mortality) scrub oak forest on nutrient-poor, sandy soils in order to maintain forest cover. • Plant 320,000 native trees and shrubs, using a mix of species that are anticipated to fare well on the site (above). • Apply wood ash on 100 acres and biochar on 33 acres to enhance productivity and drought resilience. • Reduce grass competition on 350 acres through site preparation for planting. • Conduct at least 2 field tours with forestry and conservation groups to demonstrate our approach to climate adaptation.	• An ecologically functioning forest on ~400 acres of former scrub oak forest. This area will be linked to surrounding oak, aspen, and riparian habitats. • ~350 acres of forest providing future timber resources and nesting/forage habitat for approximately 18 bird species and 9 mammal species of greatest conservation need in accordance with the Wisconsin Wildlife Action Plan (WI DNR, 2005). In addition, ~50 acres will be maintained in openings and riparian management zones with a mix of mast producing trees and shrubs as well as native ground species. • These openings will provide critical "edge" habitat for a number of species. • The young pine will provide critical dense cover for a number of wildlife species from five to twenty years of age. • Demonstration site for the effectiveness of biochar and wood ash application within Great Lakes forests.	• Creation of a forest that is less susceptible to drought and higher temperatures, while providing valuable wildlife habitat and timber resources. • Critical thermal cover (cooling and warming) will be provided that is missing on much of the surrounding landscape. • This will create ~350 acres of a young forest cohort, which will diversify into a number of age groups as the different species have different rotation ages. • Providing a future seed source within the surrounding landscape for species adapted to warmer, drier conditions. • The different oak and shrub species either planted or maintained as part of this project will provide long term mast production for a variety of wildlife species. • Jack pine provides critical habitat for a number of species at different stages throughout its life. These species include deer, bear, warblers, squirrels and numerous other wildlife species. • Provide long term site monitoring to be able to design future projects based on this project's results.

5. Monitoring

What, if any, monitoring plans do you have during and beyond the extent of this grant to measure progress towards your near-term outcomes and long-term adaptation goal? Describe the information you will use as a baseline and identify the indicators you will monitor to gauge progress towards these outcomes and

goals. Comment briefly on how you believe that monitoring information could be used to inform and potentially adjust future conservation actions.

Monitoring the effects of wood ash and biochar amendments will be a major learning opportunity associated with this project. Monitoring will provide a basis for evaluation to determine if amendments are ultimately effective at improving soil quality, tree productivity, and resilience to future moisture stress compared to untreated areas. Partners from the US Forest Service Northern Research Station and Michigan Technological University will conduct initial soil sampling prior to the application of the soil amendments in both treated and non-treated areas. Sampling will be repeated annually following treatment to monitor the changes in the following key variables: bulk density, water holding capacity, cation exchange capacity, nitrogen availability, and base cation levels. Trees will be pulled from the amendment and control sites each year to measure both above- and below-ground sizes and weights.

Information gained from soil and tree samples will be used to guide future management of the County Forests. If the use of amendments is effective, their use will be incorporated into forest management plans. Similarly, survival and growth of planted trees will be monitored according to the County's standard forest management protocols. This will help determine if the various pine and oak species are able to be successfully established through planting on similar sites throughout the landscape.

The County Forestry Department has a policy of doing survival checks on plantations after one, three and five years with replanting being done as necessary. Additionally, wildlife openings are monitored and maintained on a periodic basis by County and DNR personnel. The DNR Wildlife Manager also monitors wildlife habitat throughout the County forest on a periodic basis and gives recommendations to the County forest on activities that need to occur to maintain or improve specific habitats. The County forest is managed intensively with continual monitoring for weather, insect, and disease issues. This area is also in the Wisconsin DNR's "Intensive Fire Management" area with fire tower lookout and patrol plane monitoring during high fire danger periods.

6. Communications

a) Indicate how you plan to share your accomplishments when the project is complete. Who are the key audiences and other stakeholders that should know about this work and how will you reach them?

Regionally, there are many acres of forest stands on dry, sandy soils that have suffered dieback due to drought and other stressors and now are in need of re-planting to maintain forest cover. The effectiveness of the management strategies implemented in this project will be of value to those land managers and the woodland owners. Project accomplishments will be shared through trade magazine articles, public and association presentations, field tours, webinars, newsletters, and on websites. In addition, the innovative implementation and analysis of soil amendments on forested land has the potential to be submitted to a research journal. Some examples of communication outlets for this project include:

- Wisconsin Woodland Owners Association (WWOA), Great Lakes Timber Professionals Association (GLTPA), and Wisconsin Consulting Foresters (WCF) will disseminate project information to private landowners, loggers, and foresters.
- University of Wisconsin - Extension (UW-Ext) will help distribute information to a wide network of stakeholders in a variety of formats including articles, bulletins, and webinars.
- Project findings will be distributed to all Wisconsin Consulting Foresters (WCF) members to incorporate findings into management plans and activities for their clients.

- Wisconsin County Forests Association (WCFA) will be a conduit for information distribution at regular meetings and conferences. We plan to host future field tours with WCFA at the project site.
- Project findings will be communicated through the Wisconsin Department of Natural Resources Division (WI DNR) of Forestry.
- NIACS will distribute information about this project through the Climate Change Response Framework, through newsletters, websites, presentations, and videos.
- Statewide initiatives such as the Wisconsin Initiative on Climate Change Impacts and Climate Wisconsin will help connect this project to researchers, educators, and natural resource professionals.

b) How might this project inform or influence similar climate adaptation work in your project area or other geographies? What process or policy changes do you believe will be necessary to scale up the adoption and acceleration of climate adaptation action in your region?

Drought stress is one of the primary climate change impacts expected to increase stress on forests in the Great Lakes region. At present, forest managers have few "tools" that may be effective at mitigating this risk – thinning stands to reduce stocking levels, and favoring more drought-tolerant species. Improving soil quality through wood ash or biochar amendments is a promising adaptation tactic that has not been applied at scale in the Great Lakes region. Should the soil amendments in this project prove effective, then this management technique could be incorporated in similar forest and soil types. Loss of cover types such as scrub oak is not unique to the Florence County Forest. Land managers at county, state, and federal levels throughout the Lake States region are struggling for solutions to maintenance of forest cover in areas affected by mortality. Additionally, these same concerns extend to owners and managers of private forest land (industrial and non-industrial). Widespread application of wood ash and biochar in the short-term will be limited by supply of these materials and market infrastructure to deliver them to potential users. Additionally, many sources of wood ash, such as residue from paper mills, are being wasted or sent to landfills because an economic end-use isn't available. Demonstrating the utility of soil amendments in forestry settings could further increase demand, spur innovation, and help make sure that appropriate sources of wood ash and biochar are put to use in the Great Lakes region.

7. Leveraged Resources

To what extent will your proposed project be able to take advantage of existing resources (e.g., other funding, previous conservation efforts, protected areas, partner resources, related conservation and adaptation projects)? Is this project a component in a larger conservation endeavor or a stand-alone effort?

Climate Change Response Framework – The Framework is an integrated set of tools, partnerships, and actions to incorporate climate change considerations into forest management. This effort has been building in the region since 2009, with significant support from the US Forest Service Eastern Region, Northern Research Station, Northeastern Area (State and Private Forestry), the Upper Midwest-Great Lakes Landscape Conservation Cooperative, and the USDA Regional Climate Hubs. The Framework represents an annual investment of roughly $500,000 across the eastern US, a substantial portion of which is directly devoted to climate-informed forestry efforts in Wisconsin. The proposed project leverages the investments of the Framework by using published adaptation resources and adding to the growing network of climate adaptation demonstration projects around the region (http://www.climateframework.org/**).**

Verso Paper Corp. – The Corporation currently sells wood ash to regional farmers, and expanding wood ash applications to forests will develop a new market for their product. They have been involved in numerous studies of wood ash application on agricultural field and are eager to extend that to forest applications.

8. Partnerships

Who are your organizational partners on the project and what is their role?

Florence County Department of Forestry and Parks – Handle all on-site logistics and oversight for site preparation and planting.

Natural Resources Research Institute – Provide biochar soil amendment and share expertise on the biochar application process.

Northern Institute of Applied Climate Science – Assist with information on climate change impacts and adaptation, communicating project results, and connecting this project to a wider network of real-world adaptation demonstration projects across the eastern US: http://forestadaptation.org/demonstration-projects.

Michigan Technological University and the US Forest Service Northern Research Station – Perform soil sampling and laboratory analysis for baseline soil monitoring and subsequent annual monitoring.

Verso Paper Corp. – Provide and apply wood ash soil supplements from their mill residues.

Wisconsin Department of Natural Resources Forestry & Wildlife – Assist with developing and implementing planting and site preparation plans. They will also be instrumental in information dissemination. Provide critical input regarding planting schemes and species composition to maximize habitat for a wide range of wildlife species.

9. Organizational Qualifications

Why is your organization particularly qualified to address the identified need? What is the added value of your organization's participation in this project?

The Sustainable Resources Institute (SRI) has provided education on and certification in sustainable forestry management for nearly a decade. SRI works to increase the use of environmentally friendly and sustainable techniques for multiple-use forest management and the production of forest products through grant administration involving land managers, landowners, loggers, and sawyers. SRI has successfully partnered with private, industrial, non-governmental and governmental agencies to achieve improved forest management. Currently, SRI has a Master Stewardship Agreement with the Eastern Region of the US Forest Service through 2023. The agreement documents the cooperative effort between SRI and the Forest Service to maintain and enhance forest health through landscape restoration activities on the National Forest. SRI administers a forest management/chain of custody certificate for the Forest Stewardship Council that provides certification to private and public woodland owners in Michigan and Wisconsin. SRI's Chairperson is the Executive Director of Florence County Development Corporation and has an excellent working relationship with the County. The Wisconsin County Forest Association is an integral SRI project partner on several projects, including Master Logger Certification and the Master Stewardship Agreement. In addition, SRI's Executive Director serves as the Chair of Wisconsin Consulting Foresters, a professional organization that guides forestry policy and practices throughout the state of Wisconsin.

10. Key Staff

Include a brief bio or list of qualifications for personnel, from both your own organization and partners, who bear principal responsibility for implementation of this project.

Don Peterson is the Executive Director of Sustainable Resources Institute, Inc., a Forester, and the President of Renewable Resource Solutions, LLC. He administers grant projects and forestry programs that improve sustainable forest management through education, certification, and research.

Kari Divine is a project manager for Renewable Resource Solutions, LLC. She provides support for sustainable forestry projects and programs through coordination of resources, expertise, and communication.

Patrick Smith is the County Forestry and Parks Administrator for Florence County, Wisconsin. He is responsible for the operations of the Florence County Forestry and Parks Department. The Florence County Forestry and Parks Department manages 36,000 acres of forest land in Florence County.

Stephen Handler is a Climate Change Specialist with the US Forest Service Northern Research Station and Northern Institute of Applied Climate Science. He coordinates the Northwoods Climate Change Response Framework, providing support to forest managers on climate change impacts and adaptation.

Dr. Evan Kane is an Assistant Professor at the School of Forest Resources and Environmental Science at Michigan Technological University. His research interests include soil carbon dynamics and disturbance effects and he has worked extensively in northern and boreal forests and wetlands. Dr. Kane also runs the forest soils lab at MTU.

Mark Gregory is an Environmental Specialist with Verso Paper Corp. Mr. Gregory manages the Verso Paper Quinnesec Mill Beneficial Re-Use Programs. These programs include reuse of wood ash, paper mill bio-solids, and on-site reclaimed bark.

Brian Brashaw is Director of the Wood Materials and Manufacturing Program at the University of Minnesota-Duluth's Natural Resources Research Institute. He provides assistance to regional, national and international wood products manufacturers, government agencies and public universities.

Henry Sullivan - is the Wisconsin Department of Natural Resources liaison to the Florence County Forest. He serves as the point of contact between the state and county regarding the management of the county forest and the administration of county forest law.

11. References

Please list two references (include name, title, organizational affiliation, email, phone number) who can speak to the successful implementation of the project described in your proposal.

Jane Severt
Executive Director
Wisconsin County Forests Association
wcfa@frontier.com
(715) 282-5951

Ed Wenger
Vice-Chair of the Forestry and Parks Committee
Florence County Board Supervisor
wenger@borderlandnet.net
(715) 528-4367

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