



## *Strategies for Mitigating Climate Change with Natural and Working Lands – A Policy Analysis and Playbook*

July 15th, 2020



## Summary



Wisconsin's more than 33 million acres of forests, farms, and conservation lands cover more than 92% of our state. They play a critical role in absorbing and offsetting carbon dioxide (CO<sub>2</sub>) and other greenhouse gas emissions that are the primary cause of climate change.

Together, these “Natural and Working Lands” are a highly productive resource, contributing farm and forest products to our economy, providing recreation opportunities and a high

quality of life, and quietly but effectively offsetting CO<sub>2</sub> emissions.

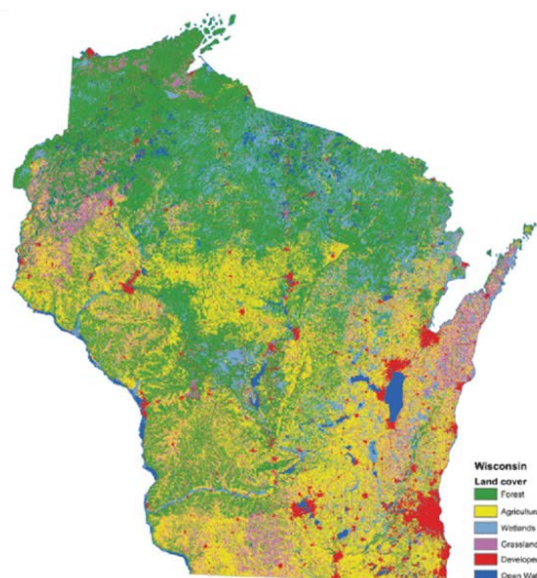
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***Natural and Working Lands make a significant contribution to cleaner air and reduced warming, with large benefits for soil, water, and people.***

***By managing our Natural and Working Lands effectively, Wisconsin could offset an additional 16 million tons of CO<sub>2</sub> each year - equal to 20% of our annual net greenhouse gas (GG) emissions<sup>1</sup>.***

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The strategies described here will help reduce greenhouse gases, and bring powerful co-benefits, such as improving forest and farm productivity, improving water quality, rebuilding soil, sustaining farm and forest jobs, and advancing environmental justice.



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***Wisconsin can help meet our goals to mitigate climate change by investing in the continued productivity of our farms, forests, conservation lands, and in the green infrastructure in our cities. Investing in the health of our working lands is one of Wisconsin's best economic development opportunities today.***

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## ***Climate-Focused Forest Management***



Forests in the United States are one of our largest carbon sinks, offsetting from 10 to 20% of total U.S. greenhouse gas emissions each year<sup>3</sup>. Forests in the northern Lake States, including northern Wisconsin, are among the most productive and stable carbon sinks in North America<sup>10</sup>. Wisconsin has more than *17 million acres of forests that comprise 49% of our total land area and store more than 1.5 billion tons of carbon dioxide*<sup>2</sup>.

Our forest carbon stores could significantly increase with climate-focused management and increased reforestation efforts, while continuing to provide the essential forest products and other social and economic benefits our forests have long provided.

Strategies include well-known practices such as selecting site-adapted species that will optimize growing space, supplemental planting in understocked forests, thinning trees for optimal growth, and extending the time between harvests (the “rotation age”). These strategies can be applied on all land ownerships, including federal, state, tribal, county forests, and private lands.

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***Applying climate-focused forest management in Wisconsin can increase carbon storage by as much as 3.4 million tons of CO<sub>2</sub> per year<sup>5</sup>. Climate-focused forestry will also improve forest resiliency and prepare our forests for the effects of a changing climate.***

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Emerging forest carbon markets are beginning to drive modified management, especially for large forest owners. Carbon markets are already shifting the balance of incentives in forest management by placing a value on trees that are still growing. Carbon markets have until now been limited to large ownerships due to their high transaction costs, however [The Nature Conservancy](#) and the [American Forest Foundation](#) are piloting new mechanisms to allow smaller family forest owners to tap into revenue from forest carbon markets.

**Reforestation** (on appropriate sites) is one of the simplest, and most powerful tools for increasing carbon sequestration on working lands.

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***Increased reforestation on public and private lands in Wisconsin could offset as much as 5.6 million tons of CO<sub>2</sub> per year<sup>5</sup>.***

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## ***Climate-Focused Agriculture***

Wisconsin has more than 13 million acres of agricultural land on farms of all sizes. Currently, the aggregate activities on agricultural lands are a net carbon source, accounting for up to 9% of our total greenhouse gas emissions annually<sup>3</sup>. Whether farms serve as a carbon source (emitting carbon) or a carbon sink (storing carbon) in the future however depends largely on cropping methods, farm operations, and nutrient inputs.

Carbon emissions in farming result from tillage practices that expose soil carbon and release CO<sub>2</sub>, use of synthetic fertilizers that release nitrous oxide (N<sub>2</sub>O), and animal manure that releases methane (CH<sub>4</sub>). N<sub>2</sub>O and CH<sub>4</sub> are powerful greenhouse gases with many times the warming effect of carbon dioxide (CO<sub>2</sub>). The energy and fossil fuel use in farm operations is also a contributing source of fossil fuel emissions<sup>3,10</sup>.



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***Employing more climate-focused agriculture could reduce greenhouse gas emissions by up to 6.1 million tons of CO<sub>2</sub> per year<sup>5,10</sup>. Climate-focused agricultural practices also have strong benefits for soil conservation and water quality protection.***

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Cover crops, careful nutrient management, and alternative crop rotations can all be integrated successfully into conventional farming, and thousands of farm operators already employ these practices. Conversion from annual cropping systems to perennial or grass-based systems have the greatest potential to store soil carbon long-term, however it is a long-term proposition. It can take up to 10 years for an increase in soil carbon to occur after employing conservation practices or transitioning to grass based systems.

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***The increased soil carbon in grass-based systems, and reduced nutrient and fossil fuel inputs, results in lower greenhouse gas emissions<sup>10</sup>. These farm systems can act as carbon sinks instead of emissions sources. As the economics of conventional farming have grown more challenging, the benefits of conversion to grass-based operations have become greater.***

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## ***Climate and Our Conservation Lands***

The term conservation lands is used here to encompass natural habitats such as wetlands, grasslands, forest preserves, and other natural communities, wild, or semi-wild areas that are generally not intensively managed, and not managed primarily for food or forest products.

Wetlands store large amounts of carbon below ground in wetland hydric zones. In deep soil wetlands, conversion can lead to methane (CH<sub>4</sub>) release, a greenhouse gas with up to 30 times more warming potential than CO<sub>2</sub>.



Native prairies store most of their carbon below ground in complex rooting systems. Grasslands, including both native prairies and managed grasslands, can be highly productive and stable carbon sinks that have high resilience to climate change impacts. In Wisconsin, complementing reforestation efforts with restoration of prairies or prairie / savanna habitats will have ecological and climate-related benefits.

Old forests may store as much as 400 tons of CO<sub>2</sub> per acre, many times more than younger forests. Old forests will reach a plateau in net sequestration when new growth is eventually offset by dying trees and decaying wood, however the large carbon stored in old forests and their high conservation value warrant their protection.



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***When conservation lands are destroyed or converted to other uses, their stored carbon is lost with them and large CO<sub>2</sub> emissions occur. Currently, carbon emissions from loss of wetlands, prairies, and conservation lands is as much as 4 million tons of CO<sub>2</sub> per year<sup>5</sup>.***

***Protecting conservation lands also preserves other critical services such as storing flood water, filtering nutrients, protecting soil, and providing critical wildlife habitat.***

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## Urban Conservation and Climate

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***Urban forests in the U.S. cover more than 130 million acres and deliver more than 10 percent of all forest-based sequestration<sup>8</sup>. Trees and greenspaces in cities store carbon, help cool and shade the environment, and contribute to more livable communities.***

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While trees in cities will contribute a smaller share of CO<sub>2</sub> reduction than other strategies, urban trees and parks hold stormwater and floodwater, improve air quality, reduce temperature and heat stress, reduce noise, and provide a host of other related social, community, wildlife, and economic co-benefits for city residents.<sup>6</sup>



Urban tree planting combined with enhanced tree maintenance increases carbon sequestration and delivers additional benefits through energy savings. This is especially true for areas suffering from urban heat island impacts.

There are also growing economic opportunities in cities for utilization and value-added processing of urban wood by small businesses.

In many underserved communities, the lack of investment in trees and parks is a legacy of redlining and other historical biases that have reinforced inequities against communities of color and low-income communities. Trees (and lack of trees) are simply one of the most basic and consistent measures of environmental equity.

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***Trees and parks are one of our best indicators of community viability. Communities with more trees and greenspaces are significantly more likely to be healthier, safer, more prosperous, and enjoy a higher level of education and quality of life<sup>6</sup>.***

***Greater investment in community tree programs is a powerful tool for improving equity and environmental justice, while sequestering as much as 330,000 tons of CO<sub>2</sub> per year<sup>5</sup>.***

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## ***Storing Carbon and Saving Energy in Wood Products***



Wisconsin forests support a *\$24 billion forest products economy* and at least 63,000 full time forestry-related jobs<sup>7</sup>. Wisconsin forest products include high-quality lumber, hardwood veneer, pulp and paper, and many other specialty products. Wisconsin has the largest paper-making industry in the United States.

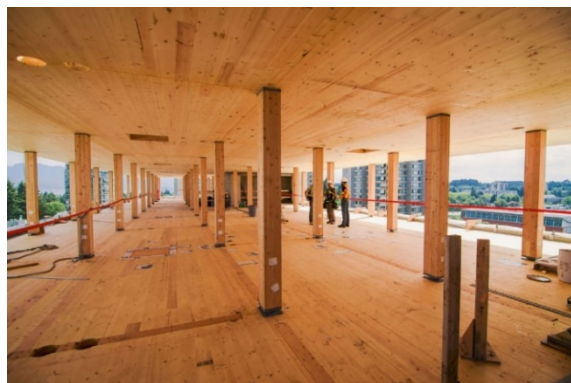
Historically, forestry has been one of Wisconsin's most stable economic sectors although loss of large paper mills and their associated jobs has been a significant setback in recent years.

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***Long-lived wood products are estimated to provide carbon storage for nearly 100 million tons of CO<sub>2</sub> every year in the U.S. That is more than 10 percent of the U.S. forest carbon sink. When managed sustainably, the forests supplying that wood continue to grow and provide carbon sequestration as well <sup>8, 10</sup>.***

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New technologies are creating opportunities for commercial building construction methods using prefabricated wood structural elements known as *mass timber*. Milwaukee will soon be home to several planned mass timber buildings, including the [Ascent building](#), which at 25 stories would be the tallest wood building in the world.



Wood building materials offer a significant climate mitigation benefit because of wood's carbon storage benefit, *and* because of the substitution benefit that occurs when wood products displace the use of building materials like steel, aluminum, and concrete that require significantly more energy to manufacture and thus have a higher carbon footprint<sup>11</sup>.

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***Building with wood is one of our best opportunities to grow jobs, strengthen our economy, reduce energy costs, and reduce our carbon footprint in buildings - one of our largest sources of greenhouse gas emissions<sup>9</sup>.***

***Increased use of wood in buildings has the potential to store over 32 million tons of carbon each year in the United States<sup>8</sup>.***

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## ***Natural and Working Lands Policy Playbook***

### ***Strategy: Protect Carbon Stocks***

*Avoid carbon losses by keeping forests, farms, and conservation lands intact.*

1. Complement the existing agricultural current use and [Managed Forest Law](#) current use programs with a *new property tax reduction for wetlands, conservation lands, and small woodlots*. A multi-year property tax reduction for undeveloped conservation lands could help avoid losses of up to 4.4 million tons of CO<sub>2</sub> to the atmosphere annually<sup>1</sup>.
2. Expand the [Farmland Preservation Tax Credit](#) and increase the tax credit for practices with conservation and carbon benefits. The FP Tax Credit is an established and accepted program that could be expanded statewide, providing an annual income stream to farm producers. Tying participation to producers adopting and following Nutrient Management Plans would provide a powerful co-benefit for water quality.
3. Restore bonding authority in the [Knowles Nelson Stewardship Program](#) (or its successor) to a total \$60 million annually. Identify criteria for project scoring in all sub-programs to prioritize: 1) projects with high potential for climate mitigation, and 2) projects that increase resiliency and flood water storage. Establish or re-establish funding levels for sub-programs as follows:
  - a. Purchase of Agricultural Conservation Easements (PACE) - \$4 million
  - b. NCO grants for fee and conservation easement purchase - \$12 million
  - c. Local Assistance Grants - \$12 million
4. Establish a *Wisconsin Conservation Income Tax Credit* for owners of farms, forests, and conservation lands for donations of qualified conservation easements that can be demonstrated to protect existing carbon stocks.
5. *Preserve farms, woodlots, and conservation lands* by encouraging local units of government to adopt planning and zoning rules that emphasize the protection of carbon stocks, improved climate resiliency, and the provision of related conservation benefits.



## ***Wisconsin's Natural and Working Lands Policy Playbook***

### ***Strategy: Climate-Focused Forest and Farm Management***

*Optimize climate mitigation, climate resiliency, and new revenue for ecosystem services on working farms and forests.*

1. Direct the Department of Agriculture, Trade and Consumer Protection (DATCP) and Department of Natural Resources (DNR) to *assist farmers and forest owners in accessing carbon markets* by modeling practices that sequester carbon. Develop carbon and climate demonstration forests on state lands. Direct UW [Agricultural Research Stations](#) to develop carbon demonstrations.
2. Direct DATCP and DNR to support small farm and forest owner access to carbon offset markets. Agencies should be provided authority to support development of carbon offset protocols and to serve as *carbon offset project aggregators* where doing so would allow small owners to gain access to farm and forest carbon markets.
3. *Increase support for transitions to grass-based farming systems* and other practices with high value in greenhouse gas reduction. Increase technical support, cost share-assistance, and funding for county conservation staff.
4. Specify carbon as a forest product and identify forest management to increase carbon stocks as a sound forestry management objective on public and private lands. State agencies and programs should follow guidance in technical work from the [Wisconsin Initiative for Climate Change Impacts](#) and [Northern Institute for Applied Climate Science](#).
5. Direct DNR Division of Forestry to provide technical support to help private forest owners rebuild carbon stocks, increase resiliency, and restore healthy forests through climate-focused forest management. *Increase funding in the [Wisconsin Forest Landowner Grant Program](#) by \$3 million.*
6. Launch a *50 Million Trees for Wisconsin* campaign. Provide cost-share funding for 10,000 acres per year of reforestation and afforestation planting through the Wisconsin Forest Landowner Grant Program and the Wisconsin Urban Forestry Grant Program.
7. Continue to invest in research, development, and commercialization of wood construction technologies using Wisconsin forest products. Direct continued partnerships and collaborations with [Wisconsin DNR Forest Products](#) programs, the Wisconsin Economic Development Corporation, and the [USDA Forest Products Laboratory](#) in Madison, Wisconsin, which is the only facility of its kind in the U.S.

## ***Wisconsin's Natural and Working Lands Policy Playbook***

### ***Strategy: Invest in Our Communities***

*Improve community resiliency, environmental equity, and climate mitigation using green infrastructure.*

- Direct DNR to conduct a broad assessment of conservation assets, parks, trees, and greenspaces in Wisconsin cities using a lens of environmental justice. Use established programs such as [Urban Footprint](#) to identify communities and neighborhoods where conservation investments are most needed and direct spending to those areas.
- Develop and promote a major urban tree and parks initiative in Wisconsin's cities.
- Increase funding in Wisconsin's [Urban Forestry Grant](#) program by an additional \$2 million per year, with at least \$1 million of new funding for tree planting and related parks and conservation practices. The Urban Forestry Grant program funds urban forestry plans and activities in municipalities throughout Wisconsin. DNR Urban Forestry program staff administer the program and provide technical support to communities.
- Increase the Local Assistance Grants in [Knowles Nelson Stewardship Funding](#) to \$12 million. Add preference criteria for projects that increase climate resilience (including flood control) and projects that mitigate greenhouse gas emissions.
- *Support Wisconsin's cities in leveraging business and corporate investment* in climate mitigation, clean water, and healthy air through programs such as the new organization, [City Forest Credits](#).
- Incentivize and support neighborhood economic development through urban wood utilization and organizations such as [Wisconsin Urban Wood](#). Small businesses utilizing urban waste wood create additional carbon storage and contribute to local and neighborhood scale economies and job training.
- Continue to build and formalize a coalition of stakeholders around conservation, environmental justice, and neighborhood equity in Wisconsin's cities.

## **Citations**

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11. [Why We Should Build Wood Skyscrapers](#). Michael Green. Ted Talk, 2013.



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Content by Wisconsin's Green Fire, Members of the Forestry and Public Lands and Climate Change Teams. July 14<sup>th</sup>, 2020

Photos contributed by: Richard Cates, Fred Clark, Ron Eckstein, Curt Meine, Bruce Neeb, James VandenBrook, Wisconsin Department of Natural Resources, and Wisconsin Department of Tourism.

### **About Wisconsin's Green Fire**

As Wisconsin's *Voice for Conservation*, Wisconsin's Green Fire brings science-based expertise together with extensive knowledge of policy and practice to natural resources conservation. WGF provides critical information and analysis on key issues from wetlands and water quality to wolf management. We help policy makers, agencies, and concerned citizens solve complex problems and capture conservation opportunities.

WGF members include committed citizens and career natural resource and environmental professionals. WGF work products, including our *2019-2020 Opportunities Now* report, are available on our website at [www.wigreenfire.org](http://www.wigreenfire.org).

[www.wigreenfire.org](http://www.wigreenfire.org)

[info@wigreenfire.org](mailto:info@wigreenfire.org)

PO Box 1206, Rhineland, WI 54501

(715) 203-0384

Fred Clark, Executive Director

[fclark@wigreenfire.org](mailto:fclark@wigreenfire.org)

