

April 4, 2014

# Forest-Climimate Working Group: Policy Platform



# Endorsing Organizations

American Bird Conservancy  
American Forest Foundation  
American Forests  
Binational Softwood Lumber Council  
CarbonVerde  
Hardwood Federation  
L & C Carbon  
National Association of State Foresters  
National Association of University Forest Resources Programs  
New England Forestry Foundation  
New Forests  
Pinchot Institute for Conservation  
Plum Creek  
Society of American Foresters  
Spatial Informatics Group – Natural Assets Laboratory  
Sustainable Forestry Initiative  
The Conservation Fund  
The Trust for Public Land  
Weyerhaeuser Company



### **About the Forest-Climate Working Group:**

The Forest-Climate Working Group is a broad and diverse coalition of forest stakeholders formed to develop consensus recommendations for U.S. forest components of federal climate policy. The participants in the Forest-Climate Working Group—landowner, industry, conservation, wildlife, carbon finance, and forestry organizations—have been working together to provide input on climate policy since 2007.

### **About the Recommendations:**

The recommendations that follow detail ways that the U.S. can sustain the greenhouse gas emissions reductions that forests and forest products currently provide, and further reduce greenhouse gasses and mitigate the effects of climate change on forests, through policies that support sustainable forest management and working forest landscapes, and promote the use of forest products.

Currently, U.S. forests reduce annual U.S. greenhouse gas emissions by roughly 13%, and the potential of our forests for additional climate change mitigation is even greater. However, recent federal reports include scenarios that suggest U.S. forest carbon sequestration could flatten and eventually decline due to development pressures and climate-driven stressors such as fire and pests. Acting on the Forest-Climate Working Group's recommendation to "retain" the up to 34 million acres of private forests projected at risk from development by U.S. Forest Service research would protect 7.57 billion tons of carbon dioxide stores, and maintain the capacity of these lands to drive future carbon reductions. To put this in perspective, these lands store carbon equivalent to emissions from 1,989 coal fired power plants for one year.

In addition to helping maintain the current reductions, the added emissions reductions and carbon sequestration benefits of other recommendations below would annually result in almost 5% of new emissions reductions needed to achieve the 17% U.S. emissions goal in the President's Climate Action Plan. Put in context of the forest sector, these reductions would lift the annual U.S. greenhouse gas emissions reduced by forests and forest products by more than 52 million metric tons--a 6% increase in annual total emissions reductions from the U.S. forest sector. This is the equivalent of one year's greenhouse gas emissions from 13.8 coal plants.

Beyond these climate mitigation benefits, implementing the Forest-Climate Working Group's recommendations will aid in climate preparedness efforts, promoting the long-term resilience of U.S. forests and the many ecosystem services that they provide. Relevant recommendations include strategies to provide climate science and decision support to private forest owners and public land managers, and integration of climate resilience objectives into the design and

and delivery of federal programs for forest conservation and private lands activities. This will help landowners to manage climate-driven shifts in forest types across the landscape, and the increase in forest stressors such as fire and pest infestations that are exacerbated by climate change.

### **Summary of Recommendations:**

**1) Provide Sound Data and Science:** Accurate, up-to-date information is needed to manage forests for the greatest carbon benefit, understand the conditions and trends of forest carbon stocks, and to address climate-driven stressors on forests. Supporting existing inventory efforts and research and applied science partnerships to understand and address threats such as fire, invasive outbreaks, and climate change, will provide landowners, land managers, and lawmakers the information they need to make sound decisions.

**2) Promote Forest Products:** Forest products, such as lumber, store carbon throughout their lifecycle. Nationwide, forest products already store 71 million metric tons of CO<sub>2</sub> annually. There are many opportunities to strengthen markets for forest products including in building construction. Measures such as these could reduce emissions by an additional 21.1 million metric tons of CO<sub>2</sub>, or .3% of annual U.S. greenhouse gas emissions, equivalent to emissions from 5.5 coal plants in one year.

**3) Restore and Manage Private Forests:** Private landowners reduce annual U.S. greenhouse gas emissions by 9%. Maintaining, and in some cases increasing, funding for conservation programs and aligning portions of these programs around climate-related goals would provide needed support to private landowners to implement management practices that maintain and grow sequestration and storage and increase preparedness. All tax incentives that support working forests are important and should be maintained to encourage the management of forests for maximum carbon benefit. Some of these incentives are more fully detailed in attachments three and four. Maintaining all tax incentives that support working forests and implementing other recommendations will help maintain the 9% of annual U.S. greenhouse gas emissions reduced by private forests and help grow these reductions by another 0.47% of U.S. emissions—equivalent to emissions from 8 coal plants in one year.

**4) Retain Existing Forests:** To maintain this important climate mitigation engine, we must keep forests as forests. The U.S. Forest Service projects over 34 million acres of private forest could be developed by 2060. Supporting federal programs for permanent forest conservation and providing tax incentives to assist private landowners with management of working forests would help maximize the amount of forest retained. Criteria that make carbon storage a priority could also be inserted into programs, which would weight properties with high carbon storage and future potential

more heavily. These 34 million acres of forest stores 7.57 billion tons of carbon dioxide—equivalent to emissions from 1,989 coal plants for a year.

**5) Develop Landscape-Scale Conservation Approaches:** Collaboration among federal, state, and non-governmental partners assists planning efforts that focus on whole forest systems, rather than individual properties. Support of regional Landscape Conservation Cooperatives and the new USDA Climate Hubs will allow continued opportunities for collaborative research and conservation on a more effective scale.

**6) Increase Urban Forests:** Urban forests currently store 68.8 million metric tons of CO<sub>2</sub> annually. An additional 100 million trees would store another 1.6 million metric tons of CO<sub>2</sub>. Support for urban forest programs, such as the U.S. Forest Service Urban and Community Forestry Program, will encourage tree planting and research on the unique aspects of urban forests.

**Summary of Carbon Benefits of Recommendations:  
(all tonnage estimates are in million metric tons of CO<sub>2</sub> or CO<sub>2</sub> equivalents)**

Recommendation	Contribution to Maintaining Current Annual Forest Carbon Reductions (866MMtCO <sub>2</sub> e)	Equivalent to annual emissions from how many coal plants?	Additional carbon sequestration/storage from recommendation?	What percent of President Obama's 17% by 2020 goal would the additional carbon sequestration/storage achieve annually?	With additional carbon sequestration/storage from recommendations, how much of annual GHGs would be reduced?
#1: Science and Data	Supports all subsequent Recommendations.		Supports all subsequent Recommendations.		
#2: Forest Products	71	18.6	21.1	1.7%	0.31%
#3: Restore and Reforest	127.36	33	31.58	2.58%	0.47%
#4: Retain Existing Forests	Supports all annual forest emissions reductions and maintaining all carbon stored in forests	227 <sup>1</sup>			
#5: Landscape Approach	Maintain benefits described in Recommendations #1, #4 and #5		Maintain benefits described in Recommendations #1 and #4		
#6: Urban Forests	68.8	18			

Note: the 866MMtCO<sub>2</sub>e in annual emissions reductions from forests is equivalent to the emissions of 227 coal plants.

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## Recommendation #1: Provide Sound Data and Science for Decision Support

### **Recommendation #1: Provide Sound Data and Science for Decision Support**

**Background:** Designing, implementing and monitoring effective forest-climate activities requires information. This includes baseline forest data through the US Forest Service Forest Inventory and Analysis program that characterizes the current forest base and helps illuminate trends. Scientific information developed through forest-climate research, such as climate-driven threats to forests as revealed by vulnerability assessments, is also essential. It is important that the Administration continue to utilize agency capacities and prioritize programs that fund this analysis and research. It is also important for climate science to be integrated into decision support tools that help private landowners and public land managers understand and apply this complex information to their specific circumstances and objectives. Accordingly, delivering climate science to help land managers and other conservation decision makers will help advance the President’s Climate Plan:

- **Climate Change Mitigation:** According to the U.S. Forest Service, U.S. Forests sequestered roughly 13 percent of annual US greenhouse emissions in 2012. However, the 2010 Resources Planning Act Assessment projects that this number could plateau and eventually fall. One major cause cited in the RPA is a predicted loss of forest health due to climate-driven stressors such as fire, insects, and disease, especially in the West. A key response to proactively address these stressors and maintain this important climate mitigation tool will be to provide forest managers—on public land and private land alike—with locally-relevant scientific information about projected future climate shifts and a range of science-based strategies to consider for management under these changing conditions.
- **Climate Preparedness:** Beyond carbon, applied science tools for landowners can also help to maintain natural resources and ecosystem services like water supplies in a changing climate. Advancing this recommendation will provide landowners with forecasts of future conditions and potential management strategies to maintain watersheds and other key natural features.

### **Fiscal Year 2015 Budget Recommendations:**

- **Forest Inventory and Analysis (FIA) – [FY15 Recommendation= \$72,000,000]:** FIA reports on the current condition and recent trends in the area of public and private forest land in the U.S. FIA provides specific information on past, current, and projected tree numbers by species; the size and health of trees; tree growth, mortality, and harvest removals; loss of forested lands due to disturbances, such as hurricanes and wildfires; wood production and utilization; and forest landownership. The program supplies the Nation’s land managers

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and private forest landowners with the data needed to make sound investment decisions in forest management activities. FIA data enables the natural resource community to understand the magnitude of changes in forest conditions and trends, and to make projections of future conditions – information vital to the long-term health and multiple uses of forests, and to altering practices as appropriate to promote forest resiliency. Funding the FIA program at \$72 million in FY15 would allow the Forest Service to maintain its existing program, which covers the majority of U.S. forest lands. However, the FIA must attain increased funding in the future in order to expedite data availability and analysis and to support our growing data needs in the areas of bioenergy and climate change mitigation and preparedness.

- **Forest Disturbances – [FY 15 Recommendation, \$28,357,000]:** This research area provides scientific information and tools that can be used by land managers and policymakers to address impacts of forest disturbances to forests and rangelands. The program strategy focuses on predicting impacts on ecosystems and providing the research that will lead to: enhanced ecosystem sustainability (preparedness); increased carbon sequestration, reduced emissions and product substitution, including biofuels and wood products (mitigation); developing decision support tools; and establishing collaborations that will enhance the delivery of the science needed to manage forest and grassland ecosystems. This information is used to develop management strategies and provide decision support tools that aid managers and policy makers in fostering preparedness for and resiliency to current and future forest disturbances across forest, range, and urban ecosystems. U.S. Forest Service Research and Development is investing in research to better understand stressors resulting from the effects of climate change, such as drought and increasing fire that impact ecosystem processes and services such as clean water, fish and wildlife habitat, carbon cycling, and forest productivity. By maintaining healthy and productive forests and grasslands, the cost of preventing and mitigating damage from wildfire, invasive pests, and other threats can be substantially reduced.
- **USDA Climate Hubs:** While the new USDA Climate Hubs will primarily draw together existing funding for greater coordination and synergy, the Forest-Climate Working Group lauds this effort to focus science development and delivery specifically targeted to the needs of the forest sector. We encourage continued use of the Hubs to organize future federal investments in these activities.
- **U.S. Forests/Natural Resource Academic Institutions:** Support should be offered to academic institutions as they carry out foundational research on climate change factors affecting forests. Possible funding could come through the McIntire-Stennis Act of 1962, The Renewable Resources Extension Act, and the Agriculture and

Food Research Initiative Program.

### **Administrative Policy Opportunities:**

- **Coordinate Existing Science and Applied Science Programs:** Utilize the Executive Order 13514, America’s Great Outdoors Interagency MOU, Landscape Conservation Cooperative (LCC) National Council, and other coordinating structures to promote alignment of preparedness science and applied science across departments.
  - Example: Identify and/or develop applied science partnerships that can become the vehicle for the USDA Climate Hubs, Climate Science Centers, LCCs, and other federal climate science efforts to share latest science and get in the hands of decision makers and land managers.
- **Reward Project Alignment with Science:** Insert criteria in relevant federal programs to incentivize projects that can demonstrate alignment with federally recognized mitigation-preparedness efforts.
  - Example: Provide points to applicants for Natural Resources Conservation Service (NRCS) landowner programs, USFS conservation programs, and DOI private landowner programs who can demonstrate consideration of climate science generated through a federally recognized mitigation-preparedness effort.

### **Models of Success:**

#### **Northwoods Climate Change Response Framework—“All Lands” Adaptation in MI, WI, & MN**

(<http://www.forestadaptation.org/northwoods>)

The Northwoods region (Ecological Province 212) covers 64 million acres of mixed Laurentian forest and boreal forest, and represents the largest single forest block in the U.S. Forest Service’s Eastern Region. There are six national forests as well as extensive state, tribal, and county forestlands intermingled with private ownership at all scales. The Northwoods landscape is currently the focus of a cutting edge public-private collaboration—the Northwoods Climate Change Response Framework led by the U.S. Forest Service—that is designed to facilitate adaptation across all forest ownerships. The Framework features four integrated approaches: 1) establishment of a diverse public-private partnership engaging all categories of land managers and conservation interests; 2) development of needed climate science through forest vulnerability assessment led by agency and academic partners; 3) development of adaptation tools, such as a forest management decision matrix, to help land managers apply climate science to their land base; and 4) demonstration projects on public, tribal, and private lands. Information on all of these activities can be found at the website above.

This effort, led by the U.S. Forest Service, has engaged the resources and collaboration of the national forest system,



state and private forestry, and research (through the Northern Institute for Applied Climate Science in Houghton, MI). Other federal partners include the National Park Service and the Great Lakes Landscape Conservation Cooperative, which has helped provide funding to Framework partners via grants and has recently formed the new Northwoods Working Group. Other partners include the state forestry agencies of Minnesota, Wisconsin, and Michigan, tribal forestry agencies, and a range of private partners including American Forest Foundation, The Nature Conservancy, and The Trust for Public Land.

The Framework has already made substantial headway in every element, from completion of vulnerability assessments and decision support tools to the establishment of demonstration projects on federal, state, tribal, and private lands. The USFS has also begun exporting the Framework model to the Central Appalachian and Central Hardwoods regions, and is working in partnership with existing science efforts in those geographies to integrate efforts.

### **Western Washington—Fostering Adaptation for Olympic National Forest & National Park**

[http://www.fs.fed.us/pnw/pubs/pnw\\_gtr844.pdf](http://www.fs.fed.us/pnw/pubs/pnw_gtr844.pdf)

For the Olympic Climate Change Case Study, federal agencies led by the U.S. Forest Service conducted a vulnerability assessment to facilitate development of adaptation strategies and actions for Olympic National Forest (ONF) and Olympic National Park (ONP). This included a review of available climate model projections, a literature review, and interviews with expert scientists to identify likely climate change sensitivities in each of four focus areas on the Olympic Peninsula, including hydrology and roads, fish, vegetation, and wildlife.

Afterwards, these agencies reviewed current management activities at ONF and ONP and identified management constraints in the evaluation of some aspects of institutional capacity to implement adaptive actions. The vulnerability assessment process sets the stage for development of adaptation options at the forest and park through science-management workshops. The workshop format gave managers an open forum to brainstorm, express initial thoughts and ideas, and vet those ideas among peers. Direct engagement of scientists and managers in the workshop format fostered development of science-based adaptation strategies—during workshop discussions, managers identified general priority actions for adaptation, as well as priorities for species protection, habitat protection, and monitoring.

The Olympic Climate Change Case Study is a leading example of the U.S. Forest Service and National Park Service jointly planning for climate change adaptation. The case study process produced specific and tangible ways for ONF and ONP to incorporate climate change adaptation strategies into management. A key finding of the assessment was that the current general management at both ONF and ONP, with restoration as a primary goal, is consistent with

managing for resilience to prepare ecosystems for a changing climate. However, the effort highlighted some potential issues related to climate change that challenged current precepts and management guidelines and helped to identify new potential actions, as well as and actions that could be increased and reprioritized.

#### Template for Assessing Climate Change Impacts and Management Options (TACCIMO)

([www.sgcp.ncsu.edu:8090/](http://www.sgcp.ncsu.edu:8090/))

The southern states provide more wood products than any other region in the US, and USFS Southern Region forests the distinction along with the USFS Eastern Region as leading the nation in total forest carbon sequestration on public and private land. While the potential for further increasing productivity within the region is excellent, there are also disturbance challenges such as drought, wildfire, hurricane, insect and disease that could significantly impact potential gains. US Forest Service scientists, in conjunction with the National Forest System, state agencies, and private forestry groups, have produced a web-based tool called TACCIMO (Template for Assessing Climate Change Impacts and Management Options) in which a land manager can quickly develop a report of potential disturbance impacts and management options to address these impacts for their specific location, forest type, and areas of concern.

TACCIMO draws on thousands of scientific papers and the suggested management options generated by TACCIMO link directly with the papers that support that recommendation. TACCIMO includes the most findings in forest management including the recently released Southern Forest Resource Assessment (SOFRA), and the Climate Change Adaptive Management Options (CCAMO). These documents represent years of collaborative study on current and projected disturbance impacts and management options to address these impacts across southern US forests. The TACCIMO development staff is constantly adding content to TACCIMO to keep the tool on the cutting edge of forest science management.

TACCIMO has been applied to many National Forests, to state forest disturbance planning in North Carolina, and by countless private land managers across the US, as a quick and accurate tool for predicting and assessing disturbance impacts. As TACCIMO continues to develop and expand, the tool will become an integral component of the newly announced USDA Climate Hubs. These hubs have the specific mission of translating scientific data and information into land manager friendly information, contacts and resources. TACCIMO will help to facilitate the hub missions as a practical management tool for disturbance impact decisions making in forest management.

These cases all stand as examples of ways in which federal agencies can engage positively to deepen our understanding and capacity to combat climate change through forest management.

## Supplemental Detail Recommendation #2: Promoting Forest Products for Climate Change Mitigation and Climate Preparedness Solutions

**Background:** Promoting the use of forest products from responsibly managed U.S. forests creates a number of significant benefits consistent with the President’s Climate Action Plan:

- Climate change mitigation benefits as these forest products store carbon throughout their lifecycle, help keep forests as forests, and help improve forest management that also has carbon benefits;
- Greenhouse gas emissions reductions when wood products are substituted for other more carbon intensive materials;
- Reduced energy use when wood is substituted for other more energy-intensive materials;
- Disaster resilient and climate preparedness construction that stores carbon and uses less energy when compared with alternatives;
- Economic growth in rural, forest-dependent communities and retention of the skills, technology, and equipment needed to maintain our working forests.

Currently, the additional carbon stored each year in forest products, reduces roughly 1% of annual U.S. greenhouse gas emissions<sup>1</sup> or 17% of annual U.S. building construction emissions<sup>2</sup>. In 2005-2007, when building construction was strong prior to the economic recession, forest products annual additional storage was nearly double this amount.

Significantly expanded use of wood in buildings could result in as much as a 30% increase in the amount of annual U.S. greenhouse gas emissions reduced by forest products. This does not take into account the potential increased wood use in tall buildings, which is likely to happen in the future with new wood technologies and building systems.

*Significantly increasing the use of wood in buildings could reduce roughly 9.5% of one year’s emissions from commercial buildings, the largest source of carbon emissions in the U.S.*

In addition to these carbon storage and substitution benefits, forest product utilization provides important indirect support to other climate mitigation and preparedness efforts as articulated in Policy Recommendations 5 and 6 of the Forest-Climate Working Group, “Retain Forests” and “Restore and Reforest.”

Strong forest product markets are part of the fabric of support needed to help keep forests as forests. Markets create economic support for long-term forest ownership and sustainable management, which in turn results in carbon benefits by

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<sup>1</sup>2013, April. Environmental Protection Agency. National Greenhouse Gas Emissions Data (1990-2012) <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Chapter-7-Land-Use-Land-Use-Change-and-Forestry.pdf>

<sup>2</sup>[http://architecture2030.org/the\\_problem/buildings\\_problem\\_why](http://architecture2030.org/the_problem/buildings_problem_why)

## Supplemental Detail Recommendation #2: Promoting Forest Products for Climate Change Mitigation and Climate Preparedness Solutions

forests as forests and improved forest management and health.

Estimates of the market growth opportunity for wood in the nonresidential market (not including tall building markets expected in the future) indicate that this increased use of wood could result in another \$1,016,400,000<sup>3</sup> in sales of wood products.

Strong markets protect against forest conversion. A USDA Forest Service estimate projected that in the South alone, 9 million acres could be converted from forest land to other land uses in the next 50 years due to a number of causes, with low timber prices and poor markets amongst the most significant underlying drivers for increased conversion<sup>4</sup>. These lands store roughly 2,018 million metric tons of CO<sub>2</sub> equivalents, just in the above-ground biomass, which is the equivalent of carbon equal to emissions from 530 coal power plants in one year. Without strong forest products markets, we stand to lose substantial forest carbon benefits.

In addition to these benefits, traditional wood construction can be readily designed to provide the integrity necessary to be disaster resilient and meet code-defined loading criteria—this will be essential as climate change leads to more frequent and more intense natural disasters. Greater structural resistance is achieved by using thicker wood panels, larger framing members, and more fasteners, resulting in a building system that includes more sequestered carbon. In contrast, alternative (non-wood) building products will require additional reinforcement, thicker structural members and attention to detail, and the environment impacts will increase due to the use of these more energy intensive materials. More robust wood buildings sequester additional carbon, while similar solutions for other materials result in a greater carbon footprint.

**Capturing More Carbon Benefits from Forest Products—Key Near-Term Market Opportunities:** While forest products in a variety of uses can offer carbon benefits, we focus our recommendations on using wood in building construction for a number of reasons: Wood in buildings is a long-lived carbon store, it's a solution that will require little extra cost and may actually save money, and implementation can quickly begin to realize carbon benefits. There are two main opportunities to increase wood in building construction in the near term:

1. non-residential, low-rise buildings like offices, public buildings, and hospitals;
2. multi-family residential buildings, such as 3-5 story apartment buildings.

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<sup>3</sup>(385\*2,640,000 MBF)= 1,016,400,000

<sup>4</sup>USDA Forest Service. 2012. [Future of America's Forest and Rangelands: Forest Service 2010 Resources Planning Act Assessment](#). Gen. Tech. Rep. WO-87. Washington, DC. 198 p.



Converting all possible non-residential, low-rise buildings to wood would result in an additional 18.4 million metric tons of carbon benefit annually<sup>5</sup>. Putting this in context of annual U.S. greenhouse gas emissions, this would amount to a 30% increase in the greenhouse gas emissions reduced by forest products annually. This includes the benefits from the carbon stored directly in the wood (which equates to about 32% of the carbon benefit) and the carbon emissions avoided from using wood in place of other more carbon intensive materials (which equates to about 68% of the carbon benefit).

In addition to the commercial building opportunities we estimate that if all possible multi-family housing was converted to wood it would result in another 2.7 million metric tons of carbon benefit from the carbon stored in the wood products and from the emissions avoided when wood is substituted for other materials<sup>6</sup>.

International trends also indicate that tall wood buildings are likely to become more common-place in the future. New wood technologies and building systems could mean as much as 20 story buildings could be built out of wood. We do not yet have an estimate of the carbon benefits from this wood use, but expect it would be significant.

**Carbon Benefits of Proposed FCWG Recommendations  
(all tonnage estimates in million metric tons)**

	<b>Annual Tons Carbon Benefit</b>	<b>Percent of Total U.S. Greenhouse Gas emissions in 2011</b>	<b>Percent of White House Reduction Goal annually<sup>7</sup></b>	<b>Cost Per ton to federal government</b>	<b>Equivalent to Emissions from how many coal plants?</b>
Maintaining strong forest products markets*	71	1%	NA, but if lost, would make goal harder to achieve.	\$0	18.6
Convert non-residential and multifamily buildings to wood	21.1	.3%	1.7%	\$0.14	5.5

Note: this does not capture the full carbon benefit of strong forest products markets in keeping forests as forests.

<sup>5</sup>Adair 2013. [http://www.fpl.fs.fed.us/documnts/pdf2013/fpl\\_2013\\_adair001.pdf](http://www.fpl.fs.fed.us/documnts/pdf2013/fpl_2013_adair001.pdf)

<sup>6</sup>Extracted from "2006 Wood Products Used in New Residential Construction U.S. and Canada, with comparisons to 1995, 1998 and 2003". Page 76 of report (which is numbered as page 28 of included spreadsheet Re

<sup>7</sup>17% below 2005 by 2020 = 1234.3 million metric tons <http://www.epa.gov/climatechange/Downloads/ghgemissions/07ES.pdf>

**Budget and Policy Recommendations—Opportunities to Realize Additional Forest Carbon Benefits from Forest Products:** The following are budget and policy recommendations that the Administration could pursue to help maintain the current climate change mitigation and preparedness benefits from forest products and contribute another 1.7% of emissions reductions towards the President’s 2020 goal.

**Fiscal Year 2015 Budget Recommendations:**

- **Woodworks:** We recommend at least \$1 million investment through the USDA Forest Service or other funding source into the Woodworks initiative, which promotes wood use in building construction (especially non-residential) through technology transfer. Technology transfer, outreach, and education efforts like WoodWorks are essential to realizing the 21.1 million metric ton carbon benefit that could come from converting non-residential and multi-family residential buildings to wood. We appreciate USDA’s recent announcement to fund this initiative at \$1 million in FY 2014 and hope this continues in the future.
- **Life Cycle Assessment Research on Wood Products:** We recommend a \$2 million investment in Life Cycle Assessment (LCA) research through the USDA Forest Service Forest Products Laboratory to ensure the most updated information about the environmental impact of wood products, with a particular focus on climate-related information.
- **Life Cycle Cost Assessment Research:** We recommend a \$50,000 investment in life cycle cost assessment research on wood use in buildings, to ensure federal agencies and private sector builders have the best information on the cost benefits of using wood products in building construction.

**Administrative Policy Recommendations:** Given that the largest growth opportunities for increasing forest products consumption are in the non-residential building market, including in the public building sector, we recommend the following federal policy changes to increase wood use in these sectors.

- **Encourage Low Emissions Building Materials in Federal Buildings.** There are two key policy changes that would increase wood use in federal buildings. These could help set a trend for increased wood use in public buildings, which are one of the largest non-residential building market opportunities.
  - Issue guidance to federal agencies, under Executive Order 13514, that allows federal agencies to count emissions reductions and carbon stored in the agency’s new wood buildings towards their goal of reducing emissions by 17% by 2020.

- Modify guidance for compliance with the High performance Building Principles to require life cycle assessment of building material options prior to construction, and to require use of building materials with the lowest feasible and cost-effective global warming potential.
- **Encourage Low Emissions Building Materials in Federally-Supported Building Construction:** In addition to federally-owned buildings, the federal government supports, through loans, grants, and tax incentives, building construction in the private and state and local government sectors. To capture additional carbon benefits from government supported projects, we recommend:
  - Modifying performance metrics for USDA’s Rural Development Community facilities loan and grant programs to require life cycle assessment of building material options prior to construction, and requiring program recipients to choose building materials with the lowest global warming potential.
- **Promote Forest Products through USDA’s Biobased Markets Program:** The USDA Biobased Markets Program offers a ready-made way to promote forest products in federal procurement and in the private marketplace. We strongly encourage the Administration to implement the Farm Bill’s new direction for the program, to include forest products, and work aggressively to promote these products in federal procurement and through the USDA labeling program. This will provide climate benefits, while also serving to support rural communities and rural jobs.

**Models of Success:**

**El Dorado High School, Southern Arkansas**

In 2011, the small community of El Dorado, Arkansas completed a new 322,500-square-foot, \$44 million high school. With an old high school badly in need of expensive repairs, the community opted to invest in a new, more cost-effective solution. The school comfortably accommodates 1,600 students, leaving enough room for enrollment to grow.

“Originally, the project was designed in steel and masonry, which is common for a building of this size,” said J. Richard Brown, P.E., principal engineer with Engineering Consultants, Inc in Little Rock. “But the budget was too high. So our response was to look at other framing types. That’s where we found considerable savings.” After investigating traditional framing materials, the architects realized maximizing the wood framing through the construction project would save about \$2.7 million.

Dimension lumber is found in the school's exterior and interior load-bearing walls, and I-joists were used for the second floor, which supports a concrete floor slab. I-joists were also used for the roof structure of the two-story building. Altogether, the project used:

- 521,760 square feet of plywood
- 632,928 board feet of dimension lumber
- 230,000 board feet of glued laminated (glulam) beams
- 134,376 lineal feet of wood I-joists

In addition to millions of dollars in savings, the building provides a tremendous carbon benefit in two ways. The carbon storage benefit of the wood products used in construction equals 3,660 metric tons of CO<sub>2</sub>, and the avoided greenhouse gas emissions from replacing more fossil-fuel intensive materials, such as steel and concrete, is 7,780 metric tons of CO<sub>2</sub>. The total potential carbon benefit of 11,440 metric tons of CO<sub>2</sub> is equivalent to taking 2,100 cars off the road for an entire year.

### **Promega Client and Staff Center, Madison, Wisconsin**

Promega, a leading biotechnology firm, wanted to build a warm, inviting place for their clients and staff. The resulting 52,000 square-foot reception area includes innovative cross laminated timber and glulam products, some of which was used to mimic a comfortable “tree-lined indoor colonnade” to welcome folks in the space.

“Once we decided to use wood, our main challenges were to achieve the desired proportions and rhythm, then select the materials, detail the connections, resolve the shear bracing, and provide the roof diaphragm to transfer lateral loads,” shared David Rousseau, design consultant for Promega. “We had a strong, collaborative design team, and Promega was an inspiring client. I had never been involved in such a complicated fusion of timber with other structural systems. Constructability and aesthetics brought us to CLT and glulam. It was an innovative solution for an innovative company.” More importantly, the combined carbon storage and avoided greenhouse gas emissions total potential carbon benefit equals 692 metric tons of CO<sub>2</sub>, or the equivalent of taking 132 cars off the road for an entire year.



## Supplemental Detail Recommendation #3: Leverage Private Forest Restoration, Reforestation, and Management for Carbon Benefits

**Background:** Managing and restoring private forests in a changing climate will create new challenges and uncertainties. Management activities will be needed to improve forest preparedness and resiliency to variables such as shifts in long term patterns of precipitation and temperature. At the same time, tree planting, improved forest management, and strategic conservation can also increase the carbon sequestration benefits of forests and enable forests to do more to help mitigate emissions in the atmosphere. There are a number of policy approaches that will help improve forest restoration, reforestation and management efforts, while also achieving meaningful carbon benefits.

**Carbon by the Numbers:** According to the USDA Forest Service (USFS), private forests account for two-thirds of the forest carbon sequestration and storage in the U.S.—reducing roughly 9% of annual U.S. greenhouse gas emissions. Federal agencies can enhance these private forest benefits with better alignment of cost-share, technical assistance and other tools that help private landowners, achieve their objectives while also advancing carbon mitigation and adaptation.

According to EPA, forest carbon sequestration has grown by 14% from 1990-2012, now reducing more than 13% of total U.S. greenhouse gas emissions. This is largely due to changes in land use (reforestation and afforestation) and improved forest productivity. Management practices that promote tree planting and increase growth rates and productivity of forests, especially when combined with increased use of wood products that continue storing carbon and reduce emissions beyond the life of the tree, have contributed significantly to this increase<sup>1</sup>. Programs that help maintain these practices where they are already happening and stimulate them elsewhere will result in significant climate mitigation benefits.

**Maintain Funding Support for Forest Conservation Programs:** All of the USDA private forest conservation programs, from the Natural Resources Conservation Service Environmental Quality Incentives Program, to the USFS Forest Stewardship Program, to the Wetlands Reserve Program, support carbon sequestration and storage by cost-sharing practices and providing technical advice to landowners for practices such as afforestation and reforestation, improved forest management, and long-term working forest conservation. In addition, each of these programs, through these same practices, help make forests more resilient in the face of climate change.

<sup>1</sup> 2014, March. Environmental Protection Agency. National Greenhouse Gas Emissions Data (1990-2012) <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2014-Chapter-7-Land-Use-Land-Use-Change-and-Forestry.pdf>

Supplemental Detail Recommendation #3: Leverage Private Forest Restoration, Reforestation, and Management for Carbon Benefits

**Budget and Policy Recommendations**

Program	FY 2015 Funding Recommendation	Estimated Annual Forest Activities (based on historic data)	Estimated Annual Carbon Benefits of Current Program (in million metric tons)	Carbon Benefit from Proposed Policy Changes (In million metric tons)
USFS Forest Stewardship Program	\$ 29 million	20 million acres covered by plans that promote resiliency—in total, NOT annually.  FY 15 funding will add 1.6 million acres	6.4	TBD
USFS Forest Health Program on Cooperative Lands	\$48 million	treat roughly 1 million acres, to increase resiliency	4	TBD
NRCS Environmental Quality Incentives Program	\$1.4 billion	86,000 acres planted in trees  121,000 acres treated through improved forest management  94,000 acres prepared for planting (carbon benefit not yet accounted for)	3.88	19.58
NRCS Wildlife Habitat Incentives Program	\$50 million	17,000 acres planted in trees  24,000 acres treated through improved forest management	0.77	

NRCS Conservation Stewardship Program	\$769 million	18,000 acres planted in trees 24,000 acres treated through improved forest management	0.81	10
FSA Conservation Reserve Program		2,022,431 acres planted in trees (total in the program, not annual)	79.9	TBD
Healthy Forests Reserve Program	\$9 million			2
Reforestation Tax Deduction	-	up to 800,000 acres reforested	up to 31.6	TBD
<b>Totals</b>			127.36 MMtCO <sub>2</sub> e annually, which reduces up to <u>1.9% of our annual U.S. emissions.</u>	at least an additional 31.58 MMtCO <sub>2</sub> e, boosting total reductions to <u>2.37% of annual U.S. emissions</u>

In their current state, these programs reduce roughly 1.9% of our annual U.S. greenhouse gas emissions. To preserve these mitigation benefits, we must maintain a strong commitment toward growing our investment in these programs (see below for conversion factors).

**Administrative Policy Recommendations:** We can go above and beyond the emission reductions produced by current program activity annually (which amounts to 1.9% of annual greenhouse gas emissions) and provide additional reductions amounting to .47% of annual U.S. greenhouse gas emissions with our suggested policy changes. These additional reductions would help meet 2.58% of the President’s 2020 emissions reductions goals annually. To do so, we recommend the following policy changes that are focused on enhancing forest carbon benefits and forest climate adaptation activities.

- 1 Percent of Environmental Quality Incentives Program (EQIP) and Wildlife Habitat Incentives Program (WHIP) set aside for forest carbon activities to work in addition to resources currently applied to forests:** We recommend NRCS set aside this pool of funds to work in regionally appropriate areas—identified with assistance from the State foresters—and allow landowners to competitively apply for these resources, subsequently allocating the resources to implement forest practices that are appropriate for the region and forest ecosystem and will result in the highest carbon or adaptation benefits. While we recognize these will not be "permanent" tons, we believe this will provide carbon benefit at relatively low cost by better focusing agency resources. We estimate, using an average acreage cost of \$15/acre, this would allow tree planting and improvement forest management on roughly 900,000 acres.
- Dedicate 500,000 acres of annual Conservation Stewardship Program enrollment for forest projects that utilize the carbon mitigation and adaptation developed as described above.** Enrollment should require landowners to provide carbon inventory and estimates with project application and should be focused in landscapes that have significant carbon resources. Given this attention to a focused strategy, qualifying lands should provide carbon storage above what would otherwise be expected.
- Weight climate mitigation and adaptation more heavily in CRP program criteria.** By the end of 2012, 27 million forested acres were enrolled in CRP in total (total enrollment, not annual), accounting for a total of 1,066 million metric tons of CO<sub>2</sub> equivalent stored in trees. This program already provides substantial carbon benefits, suggesting that slight modifications to program criteria will encourage program participants to choose tree planting activities, providing even greater carbon benefits at likely no increased cost.
- Provide opportunity for innovation in the Cooperative Forestry Assistance programs of the U.S. Forest Service to promote regionally appropriate adaptation and mitigation opportunities.** The current competitive project process should require consideration of adaptation and mitigation criteria as regionally applicable. The competitive process provides excellent opportunities to demonstrate innovation at landscape scales that can be replicated across the country. In addition, criteria for judging competitive projects are tailored to different regions of the country and can serve to focus work where it is likely to secure the greatest gain.



- **Provide \$9 million for the Healthy Forests Reserve Program, to enroll 500,000 acres of forest in landscapes with the highest carbon sequestration and storage rates,** and include practice plans for these lands and cost-share assistance that adopt regionally approved strategies that increase carbon sequestration rates over time. This investment will produce 2 million metric tons of CO2 equivalents.
- **Exempt newly-proposed NRCS user fees for landowners specifically seeking advice and assistance on forest management for climate mitigation and adaptation.** Included in the recently passed Congressional Budget, NRCS may begin to implement up to \$150 in user fees for conservation management plans and technical assistance. To cost-effectively encourage landowners to manage their forests for increased carbon sequestration and storage benefits, exempting these user fees for efforts specifically relating to forest carbon management activities will incentivize landowners to further contribute to forest carbon sequestration and storage.
- **For those companies seeking corporate carbon reductions, establish a mechanism to leverage private sector dollars with USDA federal dollars** to fund forest carbon mitigation management activities on private lands.

**Legislative Opportunities—Tax Policy Solutions for Private Working Forests:** In addition to the policy and program actions, the Administration can also advance its Climate Action Plan with support for various legislative actions by Congress that help with restoration and reforestation to sustain the carbon benefits from America's forests, especially working forests. Tax policy can have significant impacts on the ability of forest owners to maintain and enhance the carbon sequestration and storage in forests, especially working forests, resulting in important implications for roughly 13% of the nation's carbon emissions that are currently sequestered and stored by America's forests. The following recommendations are among those that will help restore and reforest America's privately owned forests, which account for more than two-thirds of the nation's forests and 59% of the nation's forest carbon stores. (Additional tax recommendations are set out in Recommendation 4.)

- **Maintain Tax Incentive for Reforestation:** As mentioned above, to ensure continuation and growth of the forest carbon sink, we must ensure continued reforestation of America's forests. The current tax code allows forest owners to deduct up to \$10,000 of reforestation costs per stand as they are incurred and amortize remaining costs over 7 years. This incentive helps offset the steep upfront costs of reforestation and ensure

continued forest cover. In 2013, the reforestation tax deduction supported reforestation on up to 800,000 acres of forestland, providing a carbon benefit of up to 31.6 million metric tons<sup>2</sup>. We urge the Administration to support maintaining this tax treatment as a means to encouraging continued reforestation to increase carbon sequestration of private forests.

- **Maintain Deduction for Forest Management Expenses as Means to Retain and Restore America's Forests:** Even as forest owners do not see returns on their forest for decades, there are annual maintenance costs in owning forests, including the costs of maintaining forest roads and culverts, protecting water quality, thinning and pesticide treatments to keep the forest from being overrun from insects and disease or catastrophic wildfires, and other operating cost such as property taxes and interest expense. These actions are all essential to retaining the working forest landscape and in some cases, restoring degraded forests, both of which are critical to protecting the carbon benefits of these lands. The current tax code allows owners to deduct these operating costs in the year that they are incurred, rather than capitalizing these costs, providing an incentive to do this regular maintenance. We urge the Administration to support maintaining this tax treatment as a means to promote retention and restoration of working forests.
- **Modify Tax Treatment of Forest Casualty Losses to Encourage Forest Retention and Restoration:** Following a catastrophic event, such as a wildfire or hurricane, the tax code currently allows forest owners to deduct either the basis (i.e. the amount of the upfront investment in the property) or the actual loss, whichever is lower. The unfortunate consequence is that many forest owners, who inherited their land or paid relatively little for the land, are able to recoup very little if any of their losses following catastrophic events. This makes reinvesting in the land, reforesting and restoring it following catastrophic events, incredibly difficult. We urge the Administration to support a change to the tax code to remove this disincentive.
- **Explore Tax Credit for Maintaining Carbon Stores in Forests:** currently, the carbon benefits of America's forests are "free" in that America's forests provide these benefits to all Americans and globally, but are not financially rewarded for this benefit. The FCWG recommends exploring with Congress a modification

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<sup>2</sup>Calculation based on Joint Committee on Taxation Expenditure Estimate for Reforestation Tax deduction for 2013 for individuals and corporations and the estimated annual per acre reforestation costs based on L.S. Bair & R.J. Alig, September 2006. *Regional Cost Information for Private Timberland Conversion and Management*, USDA Forest Service. The per acre reforestation costs were adjusted for inflation, [http://www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm).

of the existing tax credit for geological sequestration, to include a credit for carbon sequestration and storage in forests. We recommend this credit be structured so that a forest owner would conduct an initial estimate of carbon storage in their forest, receive a tax credit for every ton accounted for (credit amount could be calibrated to current market prices for carbon). In subsequent years, owners can then receive credit for carbon added to this initial estimate. In years where there is a carbon debt, from harvest or other disturbance, owners would simply not receive a credit.

- **Explore opportunities for a Forest Carbon Incentives Program:** Providing market opportunities for private landowners to be rewarded for carbon sequestration and adaptation management activities would better enable forest owners to invest in good forest stewardship and maintain and further enhance the critical forest carbon we all enjoy.

#### **Models of Success:**

**Maryland Secures GHG Reductions through Forestry:** In response to the state Greenhouse Gas Reduction Act, Maryland has established a comprehensive plan to reduce state greenhouse gas emissions by 20% from a 2006 baseline level<sup>3</sup>. While many of the reductions come from energy and transportation reductions, the third largest contributor to greenhouse gas reductions will come from agriculture and forestry practices (9.4%).

The Maryland Department of Natural Resources is well on their way to accomplishing these goals. Among other things, their strategy includes a strengthened commitment to delivering on-the-ground technical assistance for management plan production and a sustainable working landscape. Strategic carbon-related initiatives were incorporated into existing program frameworks for more targeted and measurable service delivery. The U.S. Department of Agriculture can similarly incorporate carbon-related initiatives into existing program tools and resources to better provide measurable and targeted outcomes.

**Linking Forest Carbon Benefits with Community Health in Oregon:** The Pinchot Institute's Forest Health—Human Health Initiative in Oregon is connecting landowners with corporations, specifically large health systems, to incentive carbon reductions. Through this relationship, corporations provide landowners payments to manage

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<sup>3</sup>Maryland Department of the Environment, Dec. 2011. Maryland's plan to reduce greenhouse gas emissions. Available from: <http://www.mde.state.md.us/programs/Air/ClimateChange/Documents/2011%20Draft%20Plan/2011GGRADRAFTPlan.pdf>

their forest for carbon, reducing their carbon emissions and ensuring their overall corporate sustainability, while simultaneously rewarding landowners for the valuable service they provide to climate mitigation.

*Scientific Resources: Analysis for the magnitude of carbon impact was extrapolated from the Maryland GGRA Plan<sup>4</sup>, which incorporates reasonable assumptions using best available science and data. Methodology for this analysis was developed in partnership with the U.S. Forest Service Northern Research Station.*

*Conversion Factor for forest management improvements:  $4.0e^{-6}$*

*Conversion Factor for tree planting improvements:  $3.95e^{-5}$*

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<sup>4</sup>([http://www.mde.state.md.us/programs/Air/ClimateChange/Documents/2011%20Draft%20Plan/C\\_Climate\\_Policies.pdf](http://www.mde.state.md.us/programs/Air/ClimateChange/Documents/2011%20Draft%20Plan/C_Climate_Policies.pdf))



## Recommendation #4: Utilize Existing Federal Grant Programs and Support Policies to Retain Forests

**Background:** The USDA Forest Service projects upwards of 34 million private forest acres are at risk for development by the year 2060. These forests store roughly 7.57 billion metric tons of carbon and also provide additional sequestration annually<sup>1</sup>. This carbon is equivalent to emissions from 1,989 coal fired power plants for one year. Federal programs and policies that encourage forest retention can help stem this loss, especially when combined with strong markets for forest products. Relevant forest conservation programs include the USFS Forest Legacy Program, USFS Community Forest Program, and the Land and Water Conservation Fund. The impact of these programs on conserving forests with the highest carbon stores can be leveraged by utilizing grant criteria to align these programs with carbon science and GIS data. Science-based project evaluation can also evaluate opportunities to foster climate adaptation objectives.

The Administration can also advance its goals to retain forests by supporting legislative proposals that help protect and sustain the carbon benefits from America’s forests, especially working forests. Additionally, advancing the proposals within FCWG Recommendation 2—Promoting Forest Products would help impact the rate of forest retention by enhancing economic opportunities for landowners who chose to maintain their forests as forests. This role of strong forest markets in maintaining a healthy forest sector—and therefore private forest landscapes and landowners—is a core interest of the Forest Climate Working Group.

Specifically, advancing forest retention will have multiple benefits to implementation of the President’s Climate Plan:

- Climate Change Mitigation: According to the U.S. Forest Service, U.S. forests sequester 13 percent of annual greenhouse gas emissions. However, this number could plateau and eventually fall within a few decades, according to the 2010 Resources Planning Act Assessment (RPA). One major cause of this decline cited in the RPA is the increasing loss of private forests to development due, in part, to weak markets for forest products (including forest sequestered carbon) and loss of productive forests to other uses. Private forest owners control 58 percent of US forest carbon stocks<sup>2</sup>. Conversion of private forestland for development removes that land from the ongoing sequestration cycle and likely will cause a substantial increase in energy use for that site. Development also releases soil carbon, which is effectively lost.
- Climate Preparedness: Beyond carbon impacts, forest conversion and development has direct impacts on efforts to establish large robust landscapes that can be adaptively managed over time to maintain water, habitat, timber

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<sup>1</sup> Based on USFS 2010 RPA Assessment. Also based on average carbon per acre of 60.7 metric tons.

<sup>2</sup> Carbon stocks on forestland of the United States, with emphasis on USDA Forest Service ownership, Heath et al., 2011

## Recommendation #4: Utilize Existing Federal Grant Programs and Support Policies to Retain Forests

flows, and other valuable ecosystem services in a changing climate. Climate science points strongly to fragmentation of forest blocks through development as an additional stressor that will impede effective adaptation efforts.

### Fiscal Year 2015 Budget:

- **Forest Legacy Program – [FY 15 Recommendation, \$100 million, consistent with President’s budget]**

The Forest Legacy Program is the most broadly applicable forest conservation program in the federal suite. Forest Legacy can be utilized for working forest conservation easements as well as state or local acquisition. Since its inception in 1990, Forest Legacy has helped to fund more than 2.3 million acres of conservation easements to conserve private forestlands, as well as state and local acquisitions. Private forests in the U.S. average 66.8 Tons C/Acre<sup>3</sup>. If this national average is applied to forest conversion that has been avoided through Forest Legacy, then the program has protected carbon stocks in the range of 153.64 million tons, with additional gains accruing through future growth on those acres. Available Forest Legacy funding consistently falls short of annual need—in FY14, states presented a prioritized list to the U.S. Forest Service of 58 proposed projects totaling 234,034 acres. These potential project acres represent existing carbon stocks totaling approximately 15.633 million tons, based on national per acre averages. Even the substantial increase for Forest Legacy proposed in the President’s FY14 Budget would only cover 33 of these projects, leaving millions of tons of carbon stocks unprotected. Incremental additions in annual Forest Legacy funding should be evaluated for their potential to protect stored carbon and their cost effectiveness—Forest Legacy has achieved a 1-1 non-federal match for its granted funds over the history of the program.

- **USFS Community Forest Program– [FY 15 recommendation of \$5 million]**

The USFS Community Forest Program (CFP) is a relatively new 50-50 matching grant program for local government, tribal, and local non-profit acquisition of forestland threatened with development. The program helps advance conservation with entities not eligible for Forest Legacy (e.g., tribes) or entities pursuing projects that cannot viably move through Forest Legacy due to issues of scale or timing. CFP grants are awarded nationally from funds already appropriated, creating a much shorter timeline from application to award. Typically, grants have been of much smaller size than average Forest Legacy awards. Engaging with these local entities can have real impacts on forest carbon. The Wisconsin County Forests, for example, total more than 2.1 million acres of working forest, many in large blocks totaling more than 100,000 acres.

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<sup>3</sup>Ibid.

Non-profit collaboratives such as the Mount Adams Resource Stewards in Washington State and communities such as Errol, New Hampshire have come together to purchase medium sized forest blocks of local timberland in the range of 5,000 to 10,000 acres to maintain local forest sector opportunities. Tribes have a strong interest in acquiring additional land, such as the Eastern Band of Cherokee Indians which utilized a grant from the Community Forest Program. Federal matching grants to aid these kinds of local projects can complement conservation through Forest Legacy in maintaining overall carbon stores.

### **Administrative Policy Opportunities:**

- **Optimize Grant Criteria:** Insert climate criteria into Forest Legacy, the Community Forest Program, and DOI acquisition (national parks, refuges, relevant BLM units) under federal LWCF as a means to prioritize projects that can demonstrate high value for carbon mitigation and climate adaptation. The carbon value proposition in this kind of prioritization is particularly high. Private forests in the U.S. cover a dramatic range of carbon values spanning the lowest 2.5 percentile to the highest 97.5 percentile, from 24.5 to 145.3 Tons C/Acre. By considering comparative carbon values during project selection in programs such as Forest Legacy, properties with high carbon stocks would be favored and could significantly increase the impact on carbon. For example, the U.S. Forest Service has integrated two climate change criteria into its Strategic Land Acquisition Ranking System (SLARS) that is used to evaluate proposed USFS projects under the federal side of LWCF. These criteria are excerpted below:

#### **SLARS Criterion 4: Adaptation to Reduce Climate Change Impacts**

*The Intergovernmental Panel on Climate Change defines adaptation as the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects. From a management perspective, this involves developing forest, grassland, and urban landscapes to be resilient to climate change. The acquisition program can be used as a tool to facilitate the adaptation of ecosystems to the effects of climate change to assure habitat connectivity within and among intact ecosystems, create buffers around core habitat areas, and/or protect climate “refugia”, i.e., areas where targeted species and habitat types are less susceptible to the impacts of climate change. Meeting the criteria achieve climate adaptation objectives.*

*100 points. More than any other project in the region, acquisition of the tract(s) will enhance the climate resilience of a forest or grassland for the benefit of targeted species and/or habitat types based on the strategies listed above. Give consideration to a tract(s) that falls within a forest or grassland that has been identified by a federal, state, or private entity as important to the support of climate adaptation for specie and/or habitat types*

and ecosystem services targeted by this project. Second Best = 90 points. Third = 80. Fourth = 70. Fifth = 60. Sixth = 50. Seventh = 40. Eighth = 30.

0 points. Acquisition of the tract(s) does not directly contribute to the protection of wildlife transit corridors or areas critical for conservation for adaptation purposes.

**SLARS Criterion 5: Conserving Forests for Landscape Restoration to Mitigate the effects of Climate Change**

*The Forest Service Strategic Framework for Responding to Climate Change and Open Space Conservation Strategy provide guidance regarding agency actions to meet the challenge of climate change. Land acquisition provides an opportunity to support climate change mitigation by protecting carbon stored in forests and grasslands and future carbon sequestration on those lands. Land acquisition prevents the conversion of forest and grasslands for development, thereby preventing the release of stored carbon. Further, land acquisition can create opportunities for restoration of impaired native forests and grasslands, which often leads to a higher rate of future carbon sequestration from the tract.*

100 points. Acquisition of the tract(s) comprising the project area will protect a greater quantity of existing carbon stocks than any other project in the region, in total or per-acre, or offers the greatest potential for additional carbon sequestration and storage if the acquired tracts are managed consistent with applicable management prescriptions in the Forest Plan. Potential for conversion of the tract(s) to other uses, and therefore loss of carbon mitigation values, is high due to an approved development plan for the property and/or published federal or state growth projections for the area showing high probability of conversion. Second Best = 90 points. Third = 80. Fourth = 70. Fifth = 60. Sixth = 50. Seventh = 40. Eighth = 30.

0 points. There is no threat of conversion to other uses or, if acquired, the tract(s) in the project area will be managed under land management prescriptions that allow significant development activities.

**Legislative Policy Opportunities:**

- **Maintain all Tax Policy Solutions to Retain Working Forests.** Tax policy can have significant impacts on the ability of forest owners to keep their forests as forests. The USDA Forest Service projects upwards of 34 million acres are at risk for development by the year 2060. These forests store roughly 7.57 billion metric tons of CO<sub>2</sub> equivalents, which is equivalent to the amount of carbon emitted from 1,989 coal-fired power plants in one year. The greatest losses are projected in the Southeast. Several federal policies are

needed to help keep these forests intact, including but not limited to the proposals below.

Additional tax recommendations are set out in Recommendation 4.)

- **Maintain Capital Gains Treatment of Timber Income as an Incentive to Retain Working Forests:** Forestland is a long-term investment, requiring anywhere from 10-100 years of management and maintenance of the timber asset before the owner or investor sees returns. Allowing the treatment of this income as a capital gain, subject to a 20% tax rate, provides an incentive for owners to hold forests for the long-term, manage timber sustainably, and as a result, retain this important carbon sequestration and storage engine. In comparison, if timber income is treated as ordinary income, subject to much higher tax rates, owners have little incentive to hold the asset for the long-term, putting the carbon benefits of these forests at risk. We urge the Administration to support maintaining this tax treatment as a means to promote retention and sustainable management of working forests.
- **Extend or Make Permanent the Federal Tax Credit for Conservation Easements on Working Forests:** Retaining America's working forest landscape is the first step to ensuring the continued forest carbon benefits from America's forests. Since most of America's forests are privately owned, and putting these forests in public ownership is cost prohibitive, it is essential we find ways to encourage private owners to keep forests as forests. Working forest conservation easements, that protect forests from development while encouraging continued active forest management, are one tool to retain forests and therefore ensure forests continue to be an important carbon sink. When the enhanced conservation easement incentives were enacted, we saw an increase of 250,000 more acres donated per year, and more than half of those acres are estimated to be forested, providing almost 8.2 million metric tons of CO<sub>2</sub> equivalents<sup>4</sup>. We urge the Administration to support extending or making permanent the tax incentives for working forest conservation easements.
- **Support Legislation and Resources for Forest Acquisition and Easements** As mentioned above, the Land and Water Conservation Fund is an important tool for acquiring working lands and for placing working conservation easements on forestland, including through the Forest Legacy Program. We urge the Administration to support reauthorization and in addition to the dedicated funding levels above for the Land and Water Conservation Fund, including for the Forest Legacy Program, to help keep working forests as forests.

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<sup>4</sup>Calculation based on comparison of total acres donated in years immediately prior (2004-2005) to the enactment of the enhanced conservation easement incentives and total acres donated in years immediately following enactment (2006-2007) (Land Trust Alliance). The calculation also makes the assumption that roughly 54 percent of the acres donated based on survey data from the Land Trust Alliance membership. Carbon tons per acre calculation from (<http://www.usda.gov/wps/portal/usda/usdamediafb?contentid=2010/10/0532.xml&printable=true&contentidonly=true>)



## Models of Success:

**Forest Legacy Program—Ecological Province 212 (New England and Upper Midwest):** The private forests of U.S. Forest Service Region 9 contribute the single largest wedge of US forest carbon sequestration when US forests are broken out by USFS Region and forest ownership (federal, other public, and private)<sup>5</sup>. This is in part due to this Region's high soil carbon stores on private forest, which are the highest soil carbon rates in the country.

Ecological Province 212 (EP 212), covers mixed Laurentian forest and boreal forest across the upper Midwest and Northeastern States, and contains the most carbon-rich component of private forests in USFS Region 9. A very high proportion of the carbon-rich forests across EP 212 is in private hands and unprotected from potential development. The Forest Legacy program has been essential in helping these states and private landowners in them to permanently conserve large blocks under conservation easements that include sustainable forestry provisions, as well as some selective state and local acquisitions. The leading Forest Legacy states by acreage in this region—ME, NH, MI, MN, and NY—are five of the six leading states for Forest Legacy acres conserved nationally. Forest Legacy has helped conserve over 1.3 million acres across these five states alone.

The private forests of MI (94.3 Tons C/Acre), MN (84.3 Tons C/Acre), and WI (84 Tons C/Acre) are particularly noteworthy for carbon. These states rank 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> nationally for per acre carbon values on private forestland. This carbon density is a product of the tree species, forest composition, and forest soils and peats of this region. Forest Legacy has conserved carbon stocks of 370,000 acres across these three states. For example, considering that the carbon density of private forests in Michigan is 93.4 tons of carbon per acre<sup>6</sup>, the highest level in the nation, the 150,000 acres conserved there under Forest Legacy has protected carbon stores totaling 14 million tons, with additional gains accruing over time.

Looking beyond these three states to other parts of EP 212, the most prolific Forest Legacy state in the nation is Maine, with 682,000 acres protected utilizing funding from the program. The average carbon density of Maine's private forest is 68.4 tons per acre<sup>7</sup>, suggesting protected carbon stores of 46.648 million tons in that state alone, with additional gains accruing over time.

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<sup>5</sup>Carbon stocks on forestland of the United States, with emphasis on USDA Forest Service ownership, Heath et al., 2011

<sup>6</sup>Carbon Storage in U.S. Forests, by State, Sub-Region, and Ownership Group, U.S. Forest Service, 2010

<sup>7</sup>Ibid.

Continued focus of the Legacy program on conserving large private forest acreage under conservation easement represents a cost-effective carbon strategy. Integrating carbon mitigation criteria into national ranking of proposed Legacy projects would help to maintain and even further focus this investment in carbon rich landscapes such as EP 212.

## Recommendation #5: Develop Landscape-Scale Approaches and Collaborations to Advance Climate Mitigation and Preparedness

**Background:** Developing “all lands, all hands” collaborations across large landscapes, such as the multi-state Climate Change Response Frameworks being led by the U.S. Forest Service in partnership with state foresters and other non-federal partners, can help guide an effective climate change response. Given the broad uncertainties about climate change, pursuing climate mitigation and preparedness goals across large forested landscapes allows a more comprehensive and flexible approach to maintain carbon stores and other forest-based natural resources in the face of potential climate shifts. There is a “margin for error” built into these larger-scale efforts in case local climate projections prove off target. Landscape-scale partnerships also offer efficiencies by dovetailing planning, projects, and resources from federal, state, local, and private interests into a leveraged and integrated effort. Of equal significance, landscape conservation efforts can be targeted to those forested systems that have the greatest potential for climate gains, such as forests with very high carbon stocks, or landscapes unusually prone to climate-driven stressors like fire.

Landscape conservation is an approach that integrates many of the other recommendations of the FCWG included in this package. The key distinguishing features of a landscape approach are: 1) Working across whole forest systems instead of just single properties or smaller areas; 2) Integration of multi-partner efforts, including cross-sector partnerships; and 3) Linking project-level decisions to landscape-level objectives. The base of landscape conservation is partnership—bringing together public and private entities, including private forest owners and forest products companies, to share information and develop common strategies across landscapes. The other foundation for effective landscape conservation is science that can be applied as decision support for conservation, restoration, and forest management decisions. Decision support takes the form of technical assistance as well as Geographic Information Systems (GIS) mapping. GIS can translate climate science into spatial information that helps land managers and others identify where projected changes will occur, where the highest carbon stocks are located, where forests are at greatest risk from fire and other stressors, and other relevant information. Often this information can be scaled all the way to the parcel level, which then provides guidance for technical assistance and forest planning efforts.

Strong landscape-scale partnerships and science-based decision support maximize their potential when matched by funding and other resources prioritized to actions in alignment with landscape-level goals and objectives. This means, for example, that federal agencies can help catalyze landscape strategies by prioritizing funding for projects developed in alignment with these efforts, and by combining funding sources to allow for flexible and innovative application. Often landscape conservation opens up higher levels of cross-sector synergy, such as better integration of land conservation, restoration, and adaptive management. Finding ways to combine funding and other support for these highly integrative efforts will help leverage the true power of landscape approaches.

## Recommendation #5: Develop Landscape-Scale Approaches and Collaborations to Advance Climate Mitigation and Preparedness

### Fiscal Year 2015 Budget Recommendations:

- Forest Inventory and Analysis (FIA) – [FY15 Recommendation= \$72,000,000]:** FIA reports on the current condition and recent trends in the area of public and private forest land in the U.S. It is the baseline for effective landscape conservation efforts by supplying the most fundamental data about the forest landscape itself. FIA provides specific information on past, current, and projected tree numbers by species; the size and health of trees; tree growth, mortality, and harvest removals; loss of forested lands due to disturbances, such as hurricanes and wildfires; wood production and utilization; and forest landownership. The program supplies the Nation’s land managers and private forest landowners with the data needed to make sound investment decisions in forest management activities. FIA data enables the natural resource community to understand the magnitude of changes in forest conditions and trends, and to make projections of future conditions – information vital to the long-term health and multiple uses of forests, and to altering practices as appropriate to promote forest resiliency. Funding the FIA program at \$72 million in FY15 would allow the Forest Service to maintain its existing program, which covers the majority of U.S. forest lands. However, the FIA must attain increased funding in the future in order to expedite data availability and analysis and to support our growing data needs in the areas of bioenergy and climate mitigation.
- Forest Disturbances – [FY 15 recommendation, \$28,357,000]:** This research area has been one of the most important funding sources for leading USFS forest landscape efforts such as the Climate Change Response Frameworks. Forest Disturbances provides scientific information and tools that can be used by land managers and policymakers to address impacts of forest disturbances to forests and rangelands. The program strategy focuses on predicting impacts on ecosystems and providing the research that will lead to: enhanced ecosystem sustainability (adaptation); increased carbon sequestration, reduced emissions and product substitution, including biofuels and wood products (mitigation); developing decision support tools; and establishing collaborations that will enhance the delivery of the science needed to manage forest and grassland ecosystems. This information is used to develop management strategies and provide decision support tools that aid managers and policy makers in fostering resilience to current and future forest disturbances across forest, range, and urban ecosystems. Forest Service R&D is investing in research to better understand stressors resulting from the effects of climate change, such as drought and increasing fire, which impact ecosystem processes and services such as clean water, fish and wildlife habitat, carbon cycling, and forest productivity. By maintaining healthy and productive forests and grasslands, the cost of preventing and mitigating damage from wildfire, invasive pests, and other threats can be substantially reduced.

- **USDA Climate Hubs:** While the new USDA Climate Hubs will primarily draw together existing funding for greater coordination and synergy, the Forest-Climate Working Group lauds this effort to focus science development and delivery specifically targeted to the needs of the forest sector. We encourage continued use of the Hubs to organize future federal investments in these activities.
- **Private Landowner Programs as Detailed in FCWG Recommendation 4.** These include the suite of NRCS programs funded through the Farm Bill, such as the Environmental Quality Incentives Program and Forest Stewardship Program, which can help private forest owners develop and implement forest plans in alignment with landscape-level efforts.
- **Federal Programs to Retain Forests as detailed in FCWG Recommendation 5.** These include the USFS Forest Legacy Program and USFS Community Forest Program, both of which can be applied very flexibly across the diversity of land ownership patterns and “all lands, all hands” landscape efforts across the country.
- **Collaborative Forest Landscape Restoration Program (CFLRP):** CFLRP is an important tool to foster restoration of forested landscapes on national forest lands. Projects under CFLRP include watershed restoration, reduction of fire risk, and other activities that increase the resilience of national forest lands to climate change stressors. This is consistent with FCWG Recommendation 8 to leverage climate change mitigation and adaptation on federal forests.

#### **Administrative Policy Opportunities:**

- **Align Science and Applied Science Programs with Landscape Efforts:** Utilize the Executive Order 13514, America’s Great Outdoors Interagency MOU, Landscape Conservation Cooperative (LCC) National Council, and other coordinating structures to promote alignment of science and applied science with public-private landscape initiatives involving single federal agencies, entire departments, and interdepartmental efforts.
  - Example: Identify and/or develop landscape-level partnerships that can become the locus for interdepartmental inputs from the USDA Climate Hubs, Climate Science Centers, Landscape Conservation Cooperatives, and other federal climate science efforts.



- **Reward Project Alignment with Landscape Strategies:** Insert criteria in relevant federal programs to incentivize projects that can demonstrate alignment with federally recognized mitigation-adaptation efforts across large landscapes.
  - Example: Provide points to applicants for Natural Resources Conservation Service (NRCS) landowner programs, USFS forest conservation programs, and DOI private landowner programs who can demonstrate alignment with the landscape-level objectives of a federally-recognized landscape conservation effort.
- **Utilize innovative approaches to combine funding for landscape efforts:** Administrative efforts such as Integrated Resource Restoration (IRR) at USDA show the potential power in combining funding in unique ways to break down program silos and advance project outcomes more efficiently. While IRR is only in a demonstration phase, these kinds of approaches should continue to be tested and utilized broadly where they show greater effectiveness at the landscape scale.

### Models of Success:

#### Northern Sierra (CA, NV)

(<http://northernsierrapartnership.org/>)

The Northern Sierra is a large forest landscape stretching from Lassen Volcanic National Park to Lake Tahoe. The highly productive forests of the Northern Sierra are some of the most carbon rich forests in the country, rivaling the carbon densities of tropical rainforest, and are important to the forest products industry. These forests are prone to climate-driven stressors that release carbon, such as fire and pest infestation, and are in need of substantial restoration to promote resilience. Forest restoration and other actions will also help to restore hydrologic function in the water-rich wet meadows and other watershed features of the region, which are projected to see a major reduction in snowpack under climate change.

**Mitigation and Adaptation Opportunities:** The forests of the Northern Sierra and other similar forests across the Pacific States have substantial existing carbon stocks (mean carbon density) relative to other forested regions within the United States. However, these forests are not adding net carbon at a similar rate to eastern forests. One driver in this lower rate of net current sequestration is the loss of forest carbon to fire and other stressors. The region needs substantial reduction in overstocked forest stands, which are drivers of fire risk and inhibit robust forest growth. Given the costly nature of this work, the challenge is to convert this cost into a benefit through biomass utilization of cleared

material, and other similar approaches. An additional driver for loss of sequestration and stored carbon is development that continues to encroach on scenic and recreational areas. The Northern Sierra is highly vulnerable to development given the proximity of the Bay Area, Interstate 80, and ski areas.

Another major ecosystem service in the Northern Sierra to be protected along with carbon is water. The Northern Sierra contains key headwaters serving northern California population centers like Oakland and major population centers in Nevada such as Reno. The recent threats to San Francisco's water supply from the Rim Fire were a reminder of the water-rich nature, and fragility, of the ecosystem services provided by this landscape. Integrated conservation and restoration that restores forest health and natural watershed function will provide the carbon mitigation and water resilience that is needed. This includes synergistic projects like Perazzo Meadows in the Northern Sierra, where land conservation allowed for wet meadow restoration to restore optimal hydrologic function to a highly impaired system.

**Landscape Collaboration:** The Northern Sierra has been the longstanding focus of a sophisticated collaborative landscape effort, the Northern Sierra Partnership, which involves The Trust for Public Land, The Nature Conservancy, two leading local land trusts, and the Sierra Business Council collaborating closely with the U.S. Forest Service, state agencies, and forest sector interests throughout the region. This collaboration has conserved 50 square miles of checkerboard land since 2000 through a mixture of conservation easement, public acquisition, and non-profit acquisition. More is being accomplished every year. The Partnership has brought substantial leverage to its conservation work, with only 28% of the \$75 million in funding used for this work coming from federal sources. The Partnership has delivered the remainder from state, local, and private funding. The Partnership's conservation activity has been oriented around consolidating federal ownership of key headwaters areas, and then facilitating restoration as in the Perazzo Meadows example above.

The Partnership has also sought to protect carbon stocks and promote forest health by facilitating forest restoration. Of particular importance, this diversity of partners and its close collaboration with the U.S. Forest Service has allowed the Partnership to take a true "systems approach" to promoting this climate mitigation outcome at the landscape scale. For example, the Sierra Business Council and the Sierra Nevada Conservancy (a state agency) have taken a strong role in leading forest restoration treatments of overstocked stands, and are leading the development of biomass utilization for the products of those forest treatments. The Sierra Business Council's Northern Sierra Biomass Initiative aims to create 50 MW of new green power and 350 local jobs in rural communities through enhancing biomass generation at 11 existing facilities. This kind of systems approach to

drive restoration and utilization—from supply to demand—will be critical to avoid the loss of carbon stocks to wildfire and other stressors.

### **Northwoods Climate Change Response Framework—“All Lands” Adaptation in MI, WI, & MN**

(<http://www.forestadaptation.org/northwoods>)

The Northwoods region (Ecological Province 212) covers 64 million acres of mixed Laurentian forest and boreal forest, and represents the largest single forest block in the U.S. Forest Service’s Eastern Region. There are six national forests in the Northwoods and extensive state, tribal, and county forestlands intermingled with private ownership at all scales. The Northwoods landscape is currently the focus of a cutting edge public-private collaboration—the Northwoods Climate Change Response Framework led by the U.S. Forest Service—that is designed to facilitate adaptation across all forest ownerships. The Framework features four integrated approaches: 1) establishment of a diverse public-private partnership engaging all categories of land managers and conservation interests; 2) development of needed climate science through forest vulnerability assessment led by agency and academic partners; 3) development of adaptation tools, such as a forest management decision matrix, to help land managers apply climate science to their land base; and 4) demonstration projects on public, tribal, and private lands. Information on all of these activities can be found at the website above.

This effort, led by the U.S. Forest Service, has engaged the resources and collaboration of the national forest system, state and private forestry, and research (through the Northern Institute for Applied Climate Science in Houghton, MI). Other federal partners include the National Park Service and the Great Lakes Landscape Conservation Cooperative, which has helped provide funding to Framework partners via grants, and has recently formed the new Northwoods Working Group. Other partners include the state forestry agencies of Minnesota, Wisconsin, and Michigan, tribal forestry agencies, and a range of private non-profit partners.

The Framework has already made substantial headway in every element, from completion of forest vulnerability assessments and landowner decision support tools to the establishment of demonstration projects on federal, state, tribal, and private lands that model different forest adaptation approaches. The USFS has also begun exporting the Framework model to the Central Appalachian, Central Hardwoods, and Northern Forest regions, and is working in partnership with existing science efforts in those geographies to integrate efforts.

**Background:** Urban forests are comprised of all publicly and privately owned trees within an urban area<sup>1</sup>, and these forests play a greater role in mitigating climate change impacts in our communities than previously understood. In addition to improving air and water quality and helping to cool our cities, we are now learning that the quality and extent of urban forests are linked to human health and well-being. At the same time, urban forests face unprecedented threats from invasive pests and are stressed by weather extremes and changing environmental conditions associated with a changing climate.

There are 103 million acres of urban forests in the United States. Urban forests comprise approximately 5% of total tree cover in the continental United States. Within urban areas, tree canopy cover currently averages 35%<sup>2</sup>. There are large variations in percent canopy cover depending on community size, population, region, development and other factors that create opportunities to increase canopy cover, carbon sequestration and other tree related benefits. Urban and community forestry represents a significant potential source for increasing carbon storage while connecting people and their sense of place to the climate issue.

Urban Forests Store Carbon: Currently, forests and forest products sequester and store 866.5 million metric tons CO<sub>2</sub><sup>3</sup> annually. Carbon storage by trees in urban areas nationally is about 10.2% of the estimated carbon stored in U.S. forestland and urban forest trees combined<sup>4</sup>.

The average annual net sequestration by trees in urban areas 1990 – 2010 was 58.5MMt of CO<sub>2</sub> or 16.0 MMt Carbon (C). A majority of the net sequestration increases from 1990 (13.0 MMt C) to 2010 (18.3 MMt C) are a result of the expansion of urban areas. In 2011, urban forests accounted for 8% of the total net CO<sub>2</sub> flux attributed to land use, land-use change and forestry – 68.8 MMt CO<sub>2</sub> or 18.8 MMt Carbon.

Impervious cover in urban areas averages 25% nationally. Conversely, there is 74.5% or 17.7 million ha in pervious cover that can support additional tree canopy and increased carbon storage. Tree cover levels of 60% are possible<sup>5</sup>. As trees develop and grow larger, their contributions increase over time.

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<sup>1</sup>Nowak, D.J., S.M. Stein, P.B. Randler, E.J. Greenfield, S.J. Comas, M.A. Carr, and R.J. Alig. (2010). Sustaining America's urban trees and forests: A forests on the Edge report. Gen. Tech. Rep. NRS-62. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 27 p.

<sup>2</sup>Nowak, D.J., and E.J. Greenfield (2012) Tree and impervious cover in the United States. *Journal of Landscape and Urban Planning* (107) pp. 21-30.

2011 EPA Greenhouse gas inventory

<sup>3</sup> EPA. (2013). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2011 (EPA Publication No. 430-R-13-001). U.S. Environmental Protection Agency, Washington, DC. Retrieved January 14,2014 from <http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>.

<sup>4</sup>U.S. Environmental Protection Agency, Washington, DC. Retrieved January 14,2014 from <http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>.

<sup>5</sup>Nowak & Greenfield (2012).

As trees develop and grow larger, their contributions increase over time. Extrapolating from the Maryland Carbon Reduction Plan of 2012<sup>6</sup>, planting 100,000,000 trees would result in 1.6 million metric tonnes (MMT) of additional carbon stored.

Urban and community forests offer substantive carbon storage and sequestration benefits. However, recent data suggests tree cover in urban areas in the United States is on the decline and carbon storage in urban areas is also likely on the decline<sup>7</sup>. Increased active management of urban and community forests including planning, budget, maintenance, community education and engagement improve urban and community forest health and resiliency. Continued long-term monitoring of urban forests is needed in order to better understand rates of changes in urban areas and provide better estimates of long-term carbon trends.

**Urban Forests Create Energy Efficiencies that Reduce Carbon Emissions:** In addition to direct carbon storage and sequestration benefits already reported, urban trees can also affect carbon emissions in urban areas. Planting trees in energy-conserving locations around buildings can reduce building energy use in residential and commercial areas and consequently emissions from power plants. Transpirational cooling and changes in albedo (reflective capacity) from trees alters urban microclimates that can also reduce carbon emissions from cities (e.g., reduced evaporative emissions with lower air temperatures)<sup>8</sup>.

As urban areas continue to produce substantial emissions of carbon, tree effects on carbon emissions through altering of microclimates, albedo, energy use, and emissions from the care and maintenance of those trees need to be incorporated with tree storage and sequestration estimates to develop a more complete assessment of the role of urban forests on climate change.

**Urban Forests Face Health Threats and Can Lead Community Engagement:** Urban forests provide significant environmental, social, and economic benefits to communities and ecosystems, but they are under threats from invasive exotic insects, diseases, and plants, and they are highly vulnerable to the effects of climate change. There is a lack of on the ground research on threats to urban forests, especially applied studies. These forests need attention in order to understand the threats, and to develop best practices and action plans that engage all community stakeholders in the planting and care of urban trees and forests. As one of the primary sources of green space in urban areas, trees

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<sup>6</sup>Maryland Department of the Environment, Dec. 2011. Maryland's plan to reduce greenhouse gas emissions. Available from: <http://www.mde.state.md.us/programs/Air/ClimateChange/Documents/2011%20Draft%20Plan/2011GGRADRAFTPlan.pdf>

<sup>7</sup>Nowak, D.J., Greenfield, E.J., 2012a. Tree and impervious cover change in U.S. cities. *Urban Forestry and Urban Greening* 11, pp. 21-30.

<sup>8</sup>Nowak, D. J., and D. E. Crane. 2002. Carbon storage and sequestration by urban trees in the USA. *Environmental pollution* (Barking, Essex : 1987) 116:381–9.

and forests that are located near large populations provide a great opportunity for building urban stewardship relationships between people and forests.

### **Fiscal Year 2015 Budget Recommendations:**

- **USFS Urban and Community Forestry Program—Use Urban Forests to Build Stronger and Safer Communities and Infrastructure [Over \$30 million to UCF in FY15]:** Urban and community forests are an important part of a community’s infrastructure and they can have significant benefits for clean water, clean air, energy conservation, and human health. Urban and community forests should be recognized as “green infrastructure” for the purposes of community planning and preparation for the impacts of climate change.
  - Some Federal agencies contain programs that encourage tree planting in urban areas: US Forest Service Urban and Community Forestry, the multi-agency Urban Waters Program and Smart Growth initiative, the Urban Parks Initiative at the National Park Service and the Partnership for Sustainable Communities of HUD, DOT and EPA.
  - While the development of urban areas can result in the loss of urban forests, there is still an opportunity to ensure that urban development includes increased urban forests and usable green spaces. During the creation of smart growth development plans, it is important to recognize that urban land area is also potential forest area with significant benefits, and to understanding the rural to urban gradient.
- **FS FIA Urban Component—Provide Sound Science for Urban Forests [Funded at \$5 million in FY15, in addition to fully funding the traditional FIA program]:** Designing, implementing and monitoring effective forest-climate activities requires information. This includes baseline urban and community forest data through the US Forest Service Forest Inventory and Analysis Program (FIA) that sets a baseline and monitors trends and change. Funding the full development and implementation of urban FIA is necessary to monitoring the health, growth and changes in urban forests.
  - More needs to be done to engage local organizations and individuals in the use of currently-available technologies for assessing the benefits and care of urban forests. Many state forestry agencies have already completed satellite-based urban tree inventories, and many others are in progress. Available tools such as the Forest Inventory Analysis program and i-Tree allow improved consistency among local, state, and federal inventories. Investment in technology transfer and training along with a consistent approach to assessing the extent and health of our nation’s urban forests will provide data access and use at local, state and national levels.



- Research that allows for adaptive science and bridges the gap to implementation is especially needed by public managers, private industry, and individuals seeking to expand and protect their urban forest resources and improve the quality of life in their communities.

**Legislative Opportunities:**

- Specific legislative action has been introduced regarding increasing urban and community tree canopy through strategic tree planting to reduce energy costs, enhance public parks, and aid in mitigating stormwater run-off. These efforts are deserving of Administration support.

The Forest-Climate Working Group is a broad and diverse coalition of forest stakeholders formed to develop consensus recommendations for U.S. forest components of federal climate policy. The participants in the Forest-Climate Working Group—landowner, industry, conservation, wildlife, carbon finance, and forestry organizations—have been working together to provide input on climate policy since 2007.

For more information Contact:



Rita Hite  
Executive Vice President, Woodlands  
and Policy  
2000 M Street, NW  
Suite 550  
Washington, DC 20036  
202-765-3486  
rhite@forestfoundation.org  
www.forestfoundation.org



Jad Daley, Director  
Climate Conservation Program  
Martha Wyckoff Fellow  
The Trust for Public Land  
660 Pennsylvania Ave., SE  
Suite 401  
Washington, DC 20003  
202.543.7552 X35  
jad.daley@tpl.org  
www.tpl.org