

June 2008

## Our National Forests as Carbon Sinks: A Timely and Appropriate Change in Management Emphasis

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### Recommended Citation

29 Pub. Land & Resources L. Rev. 183 (2008)

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# Our National Forests as Carbon Sinks: A Timely and Appropriate Change in Management Emphasis

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*“[R]educing deforestation and maintaining the functional integrity of extant forests are probably the biggest near-to-mid-term contributions that forestry management could make toward improving the carbon balance of the terrestrial biosphere.”<sup>2</sup>*

## I. INTRODUCTION

In October of 2007, the Nobel Peace Prize was jointly awarded to former U.S. Vice President Al Gore and the Intergovernmental Panel on Climate Change (IPCC) for their efforts to educate the world on the realities of global climate change.<sup>3</sup> The IPCC’s most recent report found that current concentrations of atmospheric carbon dioxide and methane far exceed pre-industrial levels, and that the post-industrial rise of these gases is caused by humans. It further found that the rate of increase of these long-lasting greenhouse gases is very likely causing climate change patterns that are unprecedented in more than 10,000 years.<sup>4</sup> Environmental changes linked to climate change include an increase in weather extremes like droughts, heavy precipitation events, and tropical cyclone activity, as well as decreasing snow pack, changes in permafrost conditions, and massive loss of glaciers leading to rising sea levels.<sup>5</sup> A symbolic example of these environmental changes for U.S. citizens is the prediction that all of the glaciers in

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1. Juris Doctor with a Certificate in Environmental and Natural Resource Law, and Masters of Science in Environmental Science, expected May 2008 from the University of Montana.

2. David P. Turner, William K. Ferrell & Mark E. Harmon, Ltr. To the Ed., *The Carbon Crop: Continued*, 277 Sci. 1591, 1592 (Sept. 1997).

3. Walter Gibbs & Sarah Lyall, *Gore Shares Peace Prize for Climate Change*, N.Y. Times (Oct. 13, 2007).

4. S.D. Solomon et al., 2007: *Technical Summary*, in *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 24, [http://www.aas.org/news/press\\_room/climate\\_change/media/4th\\_spm2feb07.pdf](http://www.aas.org/news/press_room/climate_change/media/4th_spm2feb07.pdf) (Feb. 02, 2007).

5. *Id.* at 40, 41, 43, 44, 49.

Glacier National Park will disappear within the next 20 years.<sup>6</sup> The IPCC predicts that possible related consequences to human health may include deaths, disease, and injury due to heat waves, floods, storms, fires, and droughts.<sup>7</sup> In recognition of the seriousness of this global dilemma, a group of retired military generals released a report in April 2007 acknowledging that climate change presents “significant national security challenges for the United States.”<sup>8</sup> The retired senior generals recommended that the U.S. “commit to a stronger national and international role to help stabilize climate changes . . . .”<sup>9</sup>

While fossil fuel use is primarily to blame for the increase in anthropogenic atmospheric carbon dioxide emissions, the recent IPCC report found that one-third of the increased emissions are caused by the effects of land use changes on plant and soil carbon stores.<sup>10</sup> Looking more closely at the issue of land use patterns and carbon storage, recent scientific studies estimate that North America stores 60 percent of global terrestrial carbon, and that 65 to 91 percent of this carbon storage is in forests, urban trees, and wood products.<sup>11</sup> Moreover, researchers currently estimate that U.S. forests offset ten percent of U.S. carbon dioxide emissions, with the potential for even more carbon sequestration.<sup>12</sup> This essay will explore the implications of these findings in terms of managing U.S. National Forest lands as carbon sinks as one mechanism to stabilize climate changes caused by increased atmospheric carbon dioxide emissions. It will suggest that in light of the recent scientific findings on climate change and the recent judicial trend toward requiring federal agencies to consider the impacts of their decisions on climate change, now is an appropriate time for the Forest Service to begin assessing the impact of continued commercial logging on global climate change. This essay will conclude by recommending that the Forest Service shift its emphasis from subsidizing commercial logging to maintaining National Forest lands as global carbon sinks.

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6. Jeff Swicord, *VOA News: Glacier National Park Rapidly Losing Its Glaciers*, U.S. Federal News (Sept. 3, 2007).

7. IPCC, 2007: *Summary for Policymakers*, in *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* 12, <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-spm.pdf>.

8. The CNA Corporation, *National Security and the Threat of Climate Change* 3 (2007), [http://securityandclimate.cna.org/report/SecurityandClimate\\_Final.pdf](http://securityandclimate.cna.org/report/SecurityandClimate_Final.pdf) (accessed Feb. 19, 2008).

9. *Id.* at 46.

10. Solomon et al., *supra* n. 4, at 25.

11. Peter B. Woodbury, James E. Smith & Linda S. Heath, *Carbon sequestration in the U.S. forest sector from 1990 to 2010*, 241 *Forest Ecology and Management* 14, 24 (2007).

12. *Id.* at 14.

## II. HISTORY OF NATIONAL FOREST MANAGEMENT

National Forests cover 193 million acres, or eight and one half percent of the total land in the United States.<sup>13</sup> Congress first acted to protect these lands in 1891 by authorizing the creation of public forest reserves.<sup>14</sup> In 1897, Congress expanded this protection by appropriating funds for forest management and providing vague guidance that the forest reserves should be managed primarily for timber production and water control.<sup>15</sup> Several years later, President Theodore Roosevelt elevated the Forest Service (FS) to the level of a formal federal agency in charge of managing these forest reserves.<sup>16</sup> Although the FS initially engaged in activities such as fire fighting, reforestation, erosion control, and administration of the Civilian Conservation Corps and the Works Progress Administration, after World War II the goals of the FS changed to industrial tree-farming in acquiescence to the post-war demand for wood products.<sup>17</sup>

Congress, however, did not agree with the FS's management emphasis on intense industrial logging, and in 1960 it pronounced that the protection of recreation, wildlife, fish, and range resources were "equally important" as the goals of timber production and water control.<sup>18</sup> Despite this new legal mandate, the FS continued its unsustainable logging practices, resulting in public outcry over the mismanagement. In 1970, the Dean of the University of Montana School of Forestry published a report criticizing the FS's logging practices.<sup>19</sup> Subsequently, following a series of U.S. Senate hearings on National Forest logging,<sup>20</sup> and a Fourth Circuit Court of Appeals decision outlawing clearcutting on National Forest lands,<sup>21</sup> Congress enacted the National Forest Management Act (NFMA) in 1976.<sup>22</sup> Included in NFMA's mandates are requirements that the FS ensure wildlife diversity and soil quality in National Forests.<sup>23</sup>

13. United States Forest Service, *About Us-Meet the Forest Service*, <http://www.fs.fed.us/aboutus/meetfs> (accessed Dec. 15, 2007)

14. Jack Tuholske & Beth Brennan, *The National Forest Management Act: Judicial Interpretation of a Substantive Environmental Statute*, 15 Pub. Land L. Rev. 53, 57 (1994) (citing Act of March 6, 1891, 26 Stat. 1103, (repealed by 90 Stat. 2792 (1976)).

15. *Id.* (citing 16 U.S.C. §§ 473-481 (repealed in part)).

16. National Forest Protection Alliance, *Looking Back at Our National Forests*, <http://www.forestadvocate.org/century/usfs.html> (accessed Dec. 14, 2007).

17. *Id.*

18. Multiple Use Sustained Yield Act of 1960 (MUSYA), 16 U.S.C. §§ 528-531 (2006); Tuholske & Brennan, *supra* n. 14, at 59 (citing 16 U.S.C. § 528).

19. Tuholske & Brennan, *supra* n. 14, at 61-62 (citing United States Forest Service, *Management Practices on the Bitterroot: A Task Force Appraisal, Files 1500, 2470* (May 1969 - April 1970) (available from the Forest Service Region One office, Missoula, Montana)).

20. *Id.* at 62.

21. *W. Virginia Div. of the Izaak Walton League of Am. v. Butz*, 367 F.Supp. 422 (N.D.W. Va. 1973), *aff'd*, 522 F.2d 945 (4th Cir. 1975).

22. 16 U.S.C. §§ 1600 - 1687.

23. *Id.* at §§ 1604(g)(3)(B), (E)(i).

In addition to NFMA's mandates, management decisions on National Forests are also governed by the procedural mandates of the National Environmental Policy Act (NEPA).<sup>24</sup> Congress passed NEPA in 1970 to force federal agencies to proactively consider the potential environmental impacts of their planned actions.<sup>25</sup> NEPA requires that federal agencies take a "hard look" at the potential environmental impacts of their proposed actions by composing a detailed Environmental Impact Statement (EIS) for all "major Federal actions significantly affecting the quality of the human environment."<sup>26</sup>

### III. RECENT DECISIONS MANDATING THAT FEDERAL AGENCIES CONSIDER CLIMATE CHANGE

In November of 2007, the Ninth Circuit Court of Appeals held that a federal agency, the National Highway Traffic Safety Administration (NHTSA), had violated NEPA by failing to consider -- in its environmental analysis document -- the cumulative impact of carbon dioxide emissions on global climate change. The Court stated that "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."<sup>27</sup> The Court did not find persuasive the agency's argument that many other factors outside of its control are causing climate change. On the contrary, the Court stressed the importance of addressing individual incremental actions that foreseeably and collectively contribute to climate change.<sup>28</sup> Notably, the Court relied heavily on National Forest jurisprudence for its analysis.<sup>29</sup>

The Ninth Circuit's decision followed a similar district court decision holding that the U.S. Fish and Wildlife Service violated the Endangered Species Act by failing to consider the environmental impacts of climate change in its environmental assessment document (the Biological Opinion).<sup>30</sup> The Ninth Circuit's decision also followed only months after the U.S. Supreme Court acknowledged the reality of global climate change in a decision holding that the U.S. Environmental Protection Agency had authority to regulate greenhouse gas emissions under the Clean Air Act.<sup>31</sup> Noting the "enormity of the potential consequences associated with [human-caused] climate change," the Supreme Court stated:

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24. 42 U.S.C. §§ 4321-4361 (2006).

25. See e.g. *Lands Council v. Powell*, 395 F.3d 1019, 1026-27 (9th Cir. 2005).

26. *Idaho Sporting Cong., Inc. v. Rittenhouse*, 305 F.3d 957, 963 (9th Cir. 2002)(citation omitted).

27. *Ctr. for Biological Diversity v. Natl. Hwy. Traffic Safety Administration*, 508 F.3d 508, 550 (9th Cir. 2007).

28. *Id.*

29. *Id.*

30. *Nat. Resources Def. Council v. Kempthorne*, 506 F. Supp. 2d 322 (E.D. Cal. 2007).

31. *Massachusetts v. Environmental Protection Agency*, 127 S. Ct 1438, 1459-60 (2007).

While it may be true that regulating motor-vehicle emissions will not by itself *reverse* global warming, it by no means follows that we lack jurisdiction to decide whether EPA has a duty to take steps to *slow* or *reduce* it . . . A reduction in domestic emissions would slow the pace of global emissions increases, no matter what happens elsewhere<sup>32</sup>

#### IV. RECOMMENDATIONS FOR NATIONAL FOREST MANAGEMENT EMPHASIS

In light of the fact that the federal courts have started to acknowledge the reality of global climate change and are now making decisions mandating that federal agencies address this reality, the Forest Service will likely soon face judicial orders that it consider the cumulative impact of its logging proposals on global climate change. Although this consideration may be a *legal* novelty, scientists have been analyzing this issue for decades. Scientific studies have determined that replacing older forests with fast-growing young trees will not provide increased carbon storage, as may be commonly assumed.<sup>33</sup> On the contrary, once an old-growth forest is logged the new young forest will take at least 200 years to recover the carbon storage previously held by the old-growth forest, if storage recovery happens at all.<sup>34</sup> This result stems from the fact that forests store 50 percent of their carbon in soil, 10 percent in woody debris, six percent in the forest floor, one percent in the understory, and only 33 percent in living trees.<sup>35</sup>

Illustratively, an agricultural field transformed into a tree plantation will only store 31 percent of its carbon storage potential, while an agricultural field transformed into an old-growth forest will store 83 percent of its carbon storage potential.<sup>36</sup> This finding led researchers to remark that "if carbon stores were the only concern then conversion to an old-growth dominated landscape would be the best option as this system stores close to 90 percent of the potential maximum, even with fire or wind disturbance and

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32. *Id.* at 1458.

33. Mark E. Harmon, *Carbon Sequestration in Forests: Addressing the Scale Question*, 99:4 *Journal of Forestry* 24, 24-25, 29 (2001) (citing C.F. Cooper, *Carbon Storage in Managed Forests*, 13:1 *Canadian Journal of Forest Research* 155-66 (1983); Harmon et al., *infra* n. 34, at 699-702; R.C. Dewar, *Analytical model of carbon storage in trees, soils and wood products of managed forests*, 8:3 *Tree Physiology* 239-58 (1991); and E.D. Schulze et al., *Managing Forests after Kyoto*, 289 *Science* 2058-59 (2000)).

34. Harmon et al., *Effects on Carbon Storage of Conversion of Old-Growth Forests to Young Forests*, 247 *Science* 699, 701 (1990).

35. Turner et al., *A Carbon Budget for the Forests of the Coterminous United States*, 5:2 *Ecological Applications* 421 (1995).

36. Mark E. Harmon & Barbara Marks, *Effects of silvicultural practices on carbon stores in Douglas-fir – western hemlock forests in the Pacific Northwest, U.S.A.: results from a simulation model*, 32 *Canadian Journal of Forest Research* 863, 871 Table 3 (2002).

no timber salvage . . . .”<sup>37</sup> As an example, researchers found that the current carbon storage in forests in Oregon and Washington is less than one-half of its potential.<sup>38</sup> They stated that there is a “substantial prospect to sequester carbon in the future, should land management and natural disturbance regimes move the region toward a landscape more dominated by old-growth forests.”<sup>39</sup>

In light of this scientific evidence, the Forest Service’s emphasis should shift from logging to carbon storage. All old-growth forest areas and previously unlogged forest areas should be preserved indefinitely for their carbon storage value. Forests that have been logged should be restored and allowed to convert to eventual old-growth condition. This type of management has the potential to double the current level of carbon storage in some regions.<sup>40</sup> In addition to helping stabilize climate change by addressing the issue of carbon dioxide emissions, this change in management emphasis would also be in line with the public sentiment of the majority of Americans who do not want to see commercial logging on National Forests.<sup>41</sup> Although, like all public policy changes, there would be economic and social impacts to this choice, only 3% of jobs associated with National Forests are logging jobs, and only 3% of the nation’s wood supply comes from National Forests.<sup>42</sup> These jobs could and should be replaced with forest restoration jobs, and the wood supply loss could and should be replaced with conservation, recycling, and the manufacture and use of alternative fibers.

## V. CONCLUSION

The recent judicial trend mandating that federal agencies consider the impacts of their proposed actions on climate change has significant implications for National Forest management. Eventually, if the FS does not begin considering the long-term cumulative impacts of its industrial logging on climate change, the courts will likely force the FS to consider those impacts. This important consideration could lead land managers and policy makers to the conclusion that National Forest lands are more valuable to the national and global community as carbon sinks than as commercial tree farms.

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37. *Id.*

38. Homann et al., *What the soil reveals: Potential total ecosystem C stores of the Pacific Northwest region, USA*, 220 *Forest Ecology and Management* 270, 281 (2005).

39. *Id.*

40. *Id.*

41. Sierra, *Logging our Legacy*, [http://findarticles.com/p/articles/mi\\_m1525/is\\_4\\_84/ai\\_55152957](http://findarticles.com/p/articles/mi_m1525/is_4_84/ai_55152957) (July 1999); National Forest Protection Alliance, *National Forest Fact Sheet: Myths and Facts of Logging National Forests* at 1, [http://www.rso.cornell.edu/snrc/documents/NFPA\\_MythsFacts.pdf](http://www.rso.cornell.edu/snrc/documents/NFPA_MythsFacts.pdf) (accessed Dec. 14, 2007).

42. Sierra Club, *Annual Report 2001* at 8, [http://www.chasesequences.com/files/sierra-club\\_report.pdf](http://www.chasesequences.com/files/sierra-club_report.pdf) (accessed Dec. 14, 2007); National Forest Protection Alliance, *supra* n. 41, at 1-2.

This conclusion is reasonable in light of the recognition that global climate change poses a threat to national security, and that the U.S. needs to “commit to a stronger national and international role to help stabilize climate changes . . . .”<sup>43</sup> Committing the National Forests to carbon storage sinks is an administratively and politically feasible step the U.S. can take to address climate change, and would likely set a precedent followed by the international community.

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43. The CNA Corporation, *supra* n. 8, at 46.

