

# Climate of Destruction:

## Sierra Pacific Industries' Impact on Global Warming



FOREST ETHICS

## Executive Summary

Global warming has definitively emerged as one of the greatest challenges in the history of our society. With the luxury of denial gone, we are faced with a frightening array of problems—and unless significant action is taken, those consequences are inevitable, drawing closer at an alarming rate.

Across the world, the debate rages about how best to deal with this massive challenge. While perspectives differ, it is clear that any plan to seriously mitigate global warming will have to address forest protection and logging practices. By absorbing massive amounts of greenhouse gases through carbon sequestration, forests are our first line of defense against global warming. To preserve that line of defense, the scientific consensus is clear: logging must be done sustainably, which means long rotations, no conversion from forests to tree plantations, and a drastic reduction in clearcutting. Doing otherwise can contribute and has contributed to the problem: Deforestation and forest destruction around the world contribute more to global warming pollution than even the transportation sector.<sup>1</sup>

As it always has with environmental issues, California is leading the way in the struggle against global warming, passing such breakthrough legislation as the Million Solar Roofs bill and the comprehensive global warming provisions of AB 32. But the state's largest logging company, Sierra Pacific Industries (SPI) is undoing California's admirable leadership. Despite conclusive scientific evidence, SPI persists in practices that have resulted, and will continue to result, in mass forest destruction that significantly adds to California's global warming pollution and creates forests more susceptible to climate change.

Through data obtained by the California Department of Forestry and Fire Protection (CALFIRE), ForestEthics has discovered that between 1997 and 2006, SPI submitted plans and received approval to destroy nearly a quarter of a million acres of California's forests through clearcutting and other forms of plantation conversion. Worse still, the data and the company's stated objectives suggest that in the next 50 years SPI will likely clearcut and/or convert to plantations up to, and perhaps more than, one million acres of California's forests.

Since the travels of John Muir gave birth to the environmental movement, these California forests have held special significance for our state and our nation. For that reason alone, SPI's actions are an affront to our shared heritage. But given what we now know about global warming, and the crucial role that California's forests play in mitigating it, SPI's actions can only be viewed as dangerously irresponsible. Until the companies and consumers that buy from SPI demand change, or until state laws are improved, the destruction detailed in this report will continue to rob California of one of its greatest resources and best defenses against global warming.

## California's Climate Protection The Vital Roles of Our Forests

Forests play a multi-faceted role in protecting us from global warming. Through the process of photosynthesis, trees absorb carbon that would otherwise go directly into the atmosphere and contribute to global warming. But it's not just trees that store carbon—the entire forest system also does, including bushes, shrubs, debris and even the forest floor and soil. In fact, only half of the carbon stored in forests is stored in trees.<sup>2</sup>

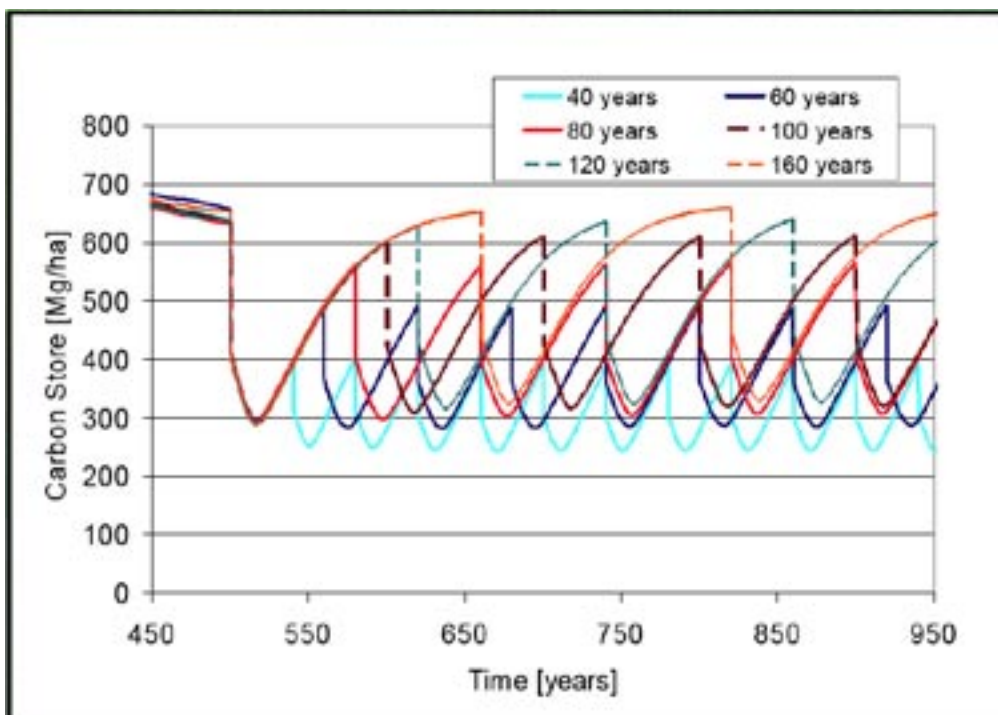
The more a forest ages, the more carbon it absorbs. What's more, the amount of carbon stored depends on the type of forest—and studies have shown that California's forests are particularly carbon-intensive.<sup>3</sup> Not surprisingly, the best way to preserve the carbon stored in a forest is to preserve the forest itself. In the words of the United Nations, "The theoretical maximum carbon storage (saturation) in a forested landscape is attained when all stands are in old-growth state[.]"<sup>4</sup>

The carbon stored in a forest can be released when the forest is disturbed for any number of reasons, including fire, pests and logging. Logging releases carbon both immediately and over time:

- 32.5% is released within 5 years
- 32% goes to forest products, 15% of which can be released in the process of harvesting, transporting and processing,<sup>5</sup> with additional releases of 2% annually through decay; and
- 35% is retained in the form of stumps, roots and soils.<sup>6</sup>

The roots and woody debris, due to the disturbance and resulting decay, continue to release carbon for years after the initial logging—even after the area is replanted with trees. In other words, clearcuts, in spite of the young replanted trees, can act as a carbon source for many years.

The longer the tree-harvesting rotation, the more carbon on average that is stored. As demonstrated in the graph below, trees on a 40-year rotation store far less carbon than trees on 160-year rotations. Cutting on shorter rotations may have an economic benefit for the owner, but the negative consequences on global warming affect everyone. source:



Average Carbon Stores on Forests of Different Rotations<sup>7</sup>

The method used to harvest trees also impacts climate change. Clearcutting is particularly bad from a carbon sequestration standpoint, releasing more carbon than any other disturbance including fire.<sup>8</sup> This includes carbon released through:

- subsequent soil erosion
- the frequent practice of burning logging debris on-site
- faster decay due to the lack of canopy cover

Clearly, from a global warming perspective, longer rotations and forms of logging that are less destructive than clearcutting help to ensure that less carbon is released and more carbon is stored on average.

Of course, both long rotations and lighter-touch logging also have other ecological benefits. Half of California's plants and animals are found in the Sierra, and many depend on the Sierra's forests for survival. This is because the forests are predominantly at lower elevations; at higher elevations, many of the trees give way to rocks and ice. Higher elevations make for stunning vistas, but they don't provide the habitat that most of the Sierra's plants and animals depend on for their survival.

The Pacific Fisher, for example, is one of the most threatened animals in the Sierra Nevada. This furry creature, a relative of the weasel, depends on primarily multi-story forests with dense canopy, old mature trees, downed logs, and woody debris<sup>9</sup>—the same qualities that are ideal for carbon storage.



Photo courtesy of Pacific Biodiversity Institute

California's water supply is also tied to forestry practices: sixty percent of California's water comes directly out of the Sierra.<sup>10</sup> Mature forests assist in providing water by protecting fallen snow with a shaded canopy throughout the year. When snow falls on a mature forest, the snow that reaches the ground can stay for months into the summer because the trees provide shaded protection. During that time, it slowly melts and filters into our rivers and streams, providing us with a regular water supply even in the hottest months. When it rains, the water falls on a coarse and woody forest floor. Instead of evaporating, the roots and soil of the mature forest absorb much of the water—and over time, it is released. In these ways, the forests help to ensure that a steady stream of water percolates out even in periods of little rain or snow activity.

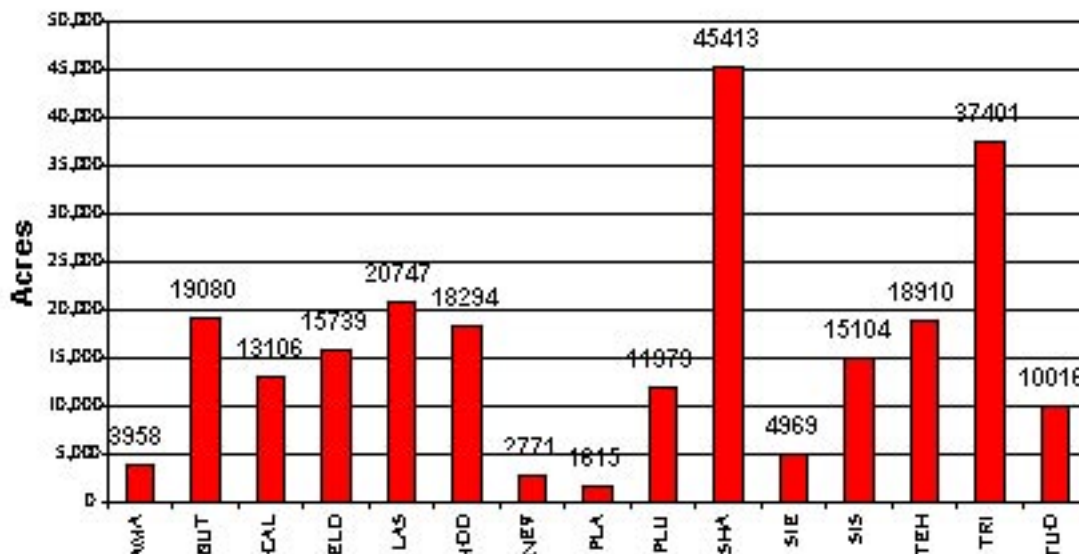
California's forests will also be vital in maintaining biodiversity in the face of the inevitable changes that global warming will bring. The more forests are mature and mimic natural ecosystems, the more adaptable they will be in supporting a diverse range of species. As our climate changes, we will need forests that can provide refuge and migratory corridors for animals that are increasingly strained by global warming's effects.

## A Devastating Legacy

### The Past, Present and Future of Sierra Pacific Industries

The data from CALFIRE paints a disturbing and bleak picture of SPI's impact on California's forests over the past ten years. *As the graph below demonstrates, close to a quarter of a million acres were approved for clearcutting and other plantation conversion between 1997 and 2006.* But what SPI has planned for California's landscape is even more alarming.

**Comparison of Approved Clearcutting and Other Plantation  
Conversion in Counties Where SPI Owns Land**



*Based on their current rate of clearcutting and an analysis of their management plan, we estimate that SPI will destroy up to one million acres over the next 50 years through clearcutting and other forms of plantation conversion.*

SPI’s business model calls for maximal profit with minimal regard for environmental cost. First, the company clearcuts an existing forest in a process that razes the entire area, wiping away shrubs, flowers, snags and trees of all sizes. In the biologically barren landscape that remains, what was once a thriving habitat for countless plants and animals is then converted into a tree plantation: acres upon acres of limited-species trees of uniform height and size, chosen for their ability to grow as fast as possible.

This business model has made SPI’s CEO a billionaire, but it has also left many of California’s forests ecologically bankrupt. As demonstrated earlier, this method of clearcutting and plantation conversion releases more carbon than any other disturbance, including fire, since it not only takes all the trees at once but also digs up soil and other forest-floor components that store carbon.

In addition to its role in exacerbating climate change, SPI also exposes California to a wide range of other detrimental environmental impacts, some of which are potentially catastrophic.

**Fire risk.** As global warming progresses, SPI’s methods put California at significantly greater risk for future catastrophes. Climate change models suggest longer, hotter and drier summers to come, as well as less snowfall and more rain in the winter.<sup>11</sup> Needless to say, these are the perfect conditions for fire. While naturally occurring fires have always been a part of the Sierra’s ecology—indeed, many plants depend on fire for reproduction—the tree plantations that SPI creates are far more vulnerable to unnaturally intense and widespread fire damage.

Due to the even height and spacing of its trees, tree plantations are more vulnerable to crown fires—intense fires that easily “climb” the ladders of branches in the plantations and then jump from tree to tree with dangerous speed. In a natural, mature forest, the uneven nature of the forest structure makes the area less susceptible to a crown fire. While the fire burns the understory and brush, the thick, mature trees tend to withstand the heat. Studies have shown that plantations have a much higher mortality rate in fires than natural, mature forests.<sup>12</sup>

Add to this the fact that plantations hold less moisture than mature forests<sup>13</sup>, and the potential for extremely destructive fires is disturbingly clear.

A California state study suggests that as global warming continues, pine plantations will yield less timber than more natural forest structures. The California Climate Change Center concludes that, “Planting mixtures of species, maintaining several age classes, reducing tree density, and pruning trees at strategic intervals are examples of cultural practices that could improve timber yields.”<sup>14</sup> Despite this, SPI continues to cling to its archaic ways in order to maximize short-term profit.



Photo courtesy of Jim Brobeck

**Water storage.** Water storage is another element that is compromised by clearcutting and conversion to tree plantations. In a clearcut, snow is collected, but it melts faster. When it rains, water is typically not absorbed due to the compacted soil. Instead, it runs off, carrying with it silt and sediment—along with the chemical herbicides that are used in plantation conversion. In both cases, water storage is compromised: rivers and streams have greater fluctuations between high and low flows.<sup>15</sup> Given the increasing scarcity of water, especially at the end of the summer, this is a particularly important issue.

**Plant and animal habitat.** SPI’s practices, as suggested earlier, also create a life-threatening habitat crisis. Plants are destroyed, and animals such as the Pacific Fisher, one of the most threatened animals in the Sierra, are left with literally nowhere to go. The elements that the Pacific Fisher depends on—dense canopies, old mature trees, downed logs and woody debris—are absent in an SPI clearcut. Trees are cut, machines clear the soil and remove fallen logs, and the replanted young seedlings of even age and height will never form the uneven canopy structure on which this animal depends.

Oak trees are also frequent victims of clearcutting. Oaks are some of the most important trees in the forest ecosystem because of their acorns, which provide food to countless animals in the Sierra. They also act as natural firebreaks, since they are not as volatile as softwoods. However, they simply do not have the value that pine, cedar and fir have for Sierra Pacific Industries. As a result, they are often cut down and burned on-site, along with other wood and debris for which SPI has no need.

**Pollution.** Pollution is another significant environmental consequence of SPI’s practices, due to the company’s use of herbicides in growing their plantations. After a forest is clearcut, the open, sunlit area provides opportunities for a wave of new growth, such as grasses, wildflowers, dogwoods, maples, oaks, and bushes, all of which provide food and habitat for wildlife. To SPI, however, all of this growth and sustenance is viewed only as competition for the young replanted saplings—so SPI sprays the natural growth with toxic herbicides. Among the herbicides that SPI may employ on any clearcut area are hexazinone, imazapyr, 2,4-D, triclopyr, glyphosate, atrazine and simazine. Herbicides such as atrazine, hexazinone and simazine are all banned in Europe.<sup>16</sup> Atrazine has been shown to cause male frogs to grow ovaries at low levels.<sup>17</sup> 2,4-D is a groundwater contaminant and can break down into dioxin, an extremely toxic compound. As just one example of this herbicide usage, SPI applied atrazine in 2004 on 74 different occasions in the Stanislaus River watershed over two months, for a total of 2,787 pounds.<sup>18</sup>

The danger of all these hazardous chemicals might be more manageable if the toxins were confined to SPI lands—but they aren’t. Rainfall can carry the chemicals far beyond the boundaries of the clearcut, posing a

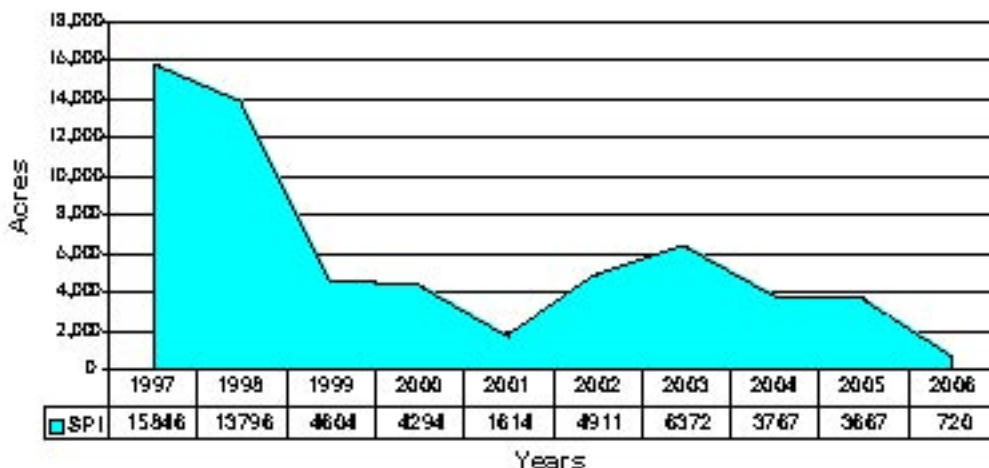
health hazard in public areas and in California's water supply.

**A better way: selection logging.** Selection logging can be an economically and ecologically viable alternative to the widespread destruction and unnatural conversion of forests into plantations. Selection logging—which doesn't disrupt soil, leaves more woody material and doesn't remove all trees at once—can leave a greater bank of carbon, thus providing more protection from global warming.<sup>19</sup>

A selection harvest is one in which only a selected portion of the merchantable trees are removed from a forest site. This is classified as "unevenaged management" in the California Forest Practices Rules since it leaves behind a forest of various sizes, ages and types.<sup>20</sup> SPI has used selection logging in the past, as shown by the graph below. But since 1999, as clearcutting and evenaged management increased, selection harvest decreased. Between 1999 and 2006, SPI selectively logged a total of only 29,949 acres for an average of 3,743 acres a year. In that same time frame, they clearcut and converted to plantations 201,943 acres, for an average of 25,243 acres annually. *SPI has averaged over 6.7 times more clearcutting and plantation conversion than selection harvesting between 1999 and 2006.*

Not all selection harvesting is necessarily a good thing. For example, the practice of "high grading" removes the most valuable tree species from a forest and leaves behind an unhealthy forest lacking diversity. However, SPI's practice of clearcutting and plantation conversion is the most detrimental form of logging to our ecology and our struggles against global warming.

**SPI's Selection Logging Over Time**



## Distorting the facts

### Misinformation about global warming from SPI and the forest industry

Rather than reform its practices, SPI and others in the forest industry have chosen to deal with the issue of global warming by spreading misinformation. Here are just a few of the myths that SPI would like the public to believe:

**Myth #1: We should aggressively log so that we can create more wood products, since wood products store carbon more securely than trees.** This argument hinges on the assumption that carbon remains stored in wood products indefinitely, and that no carbon is lost in the transfer from tree to wood product—neither of which is true. Forest products

retain only 10-20% of a forest's total carbon.<sup>21</sup> As noted earlier, the carbon in wood products is released over time, at a rate of approximately 2% each year, which is no different than the rate of release for woody debris on the forest floor. Also, carbon stored in mature, fire-resistant trees remains sequestered for decades or centuries, while many wood products last less than 50 years. While the timber industry cites wood products in landfills as a means of carbon storage, this is actually an example of carbon being released as the products decay.

**Myth #2: Young forests absorb more carbon than old forests because they grow faster.** Young trees can grow faster than older ones, but this is a minor issue when compared to the other critical aspects of carbon storage. Any advantage that young trees have in terms of carbon uptake is vastly outweighed by the greater amount of carbon that was released by clearcutting the mature forest. Furthermore, companies like SPI are not replacing mature forests with young forests—they're replacing mature forests with plantations, and for the reasons detailed earlier, plantations are significantly less effective at carbon storage. Only by growing a forest of equal age and diversity could a company such as SPI recover the carbon loss—and given the shorter rotations and stunted diversity of SPI's plantations, this recovery is impossible.

In short, the issue is not the speed of carbon uptake but rather the average amount of carbon stored over time. Creating plantations and harvesting on short rotations simply doesn't store as much carbon as selective harvesting and long rotation cycles.

**Myth #3: Clearcutting is good, because otherwise the carbon would be released in a fire.** Trees, of course, can be destroyed in a fire; but what is destroyed is only a fraction of the carbon stored. Most of the carbon remains trapped in the dead trees and soils. Over time, the carbon is slowly released—but with new trees and growth occurring naturally all around, the carbon loss is recovered. In contrast to clearcutting, the net carbon release is smaller.



Photo courtesy of Marily Woodhouse

## Looking to the Future

### How to change SPI's practices

Moving forward, SPI will continue to exacerbate global warming and threaten California's health as long as state agencies continue to permit SPI's practices and as long as there is a market for SPI's wood. Neither of these conditions will change without significant public pressure.

Currently, SPI does not have difficulty marketing its wood because most of its corporate customers are unaware of the destruction they are fueling through their purchases. These "customer companies" must demand that SPI change its practices of aggressive clearcutting and plantation conversion. The general public is equally unaware of SPI's practices due to SPI's strategy of clearcutting away from major highways and population centers. Many Californians no doubt believe that clearcutting is illegal and only happens in other countries.

To change the course of destruction that is contributing to global warming and ravaging the state's forests, wildlife, water, air, rural economies and iconic beauty, California's citizens must become informed and engaged. We must demand truly sustainable wood in the products we purchase and hold state decision-makers to the high standards of environmental protection for which California is famous.

There are several ways to help stop SPI's destructive logging practices:

#### 1. Get involved with ForestEthics.

Go to [www.savethesierra.org](http://www.savethesierra.org) to become involved in our ongoing efforts and campaign activities.



**2. Contact California's legislators, resource agencies and Governor.**

If you live in California, tell your legislators, resource agencies and the Governor that to meet the intent of California's Public Resource regulations, they must stop clearcutting and plantation creation in the state's forests and require healthy forms of selective logging.

**3. Encourage businesses in your own community to vote with their dollars.**

SPI products can be found in many places and in countless forms, including dimensional lumber at Home Depot stores, the framing package of companies such as KB Homes and other homebuilders, "SierraPine" products and Sierra Pacific Windows, which you may find at your local window and door shop. Talk to managers at these locations as well as contractors, architects and others who work with wood and let them know about the threat that SPI poses to the Sierra's forests. Urge them to give preference to alternatives until SPI changes its logging practices.

**4. Vote with your dollars.**

In your own buying practices, shift to supporting more environmentally friendly wood. The best option available now is wood certified under the Forest Stewardship Council, or FSC. There are other weaker certifications systems, most notably the Sustainable Forestry Initiative, or SFI. The SFI is a largely industry-driven certification that has certified SPI and does not provide consumers with the same guarantees and assurances as wood that comes from a truly sustainable forest.

## About the Methodology and Terminology

The statistics used in this study came from the California Department of Forestry and Fire Protection (CALFIRE), the agency that oversees and regulates all timber harvest plans (THPs) for private landowners.

Data for this report included all THPs approved by CALFIRE. Since timber operators have three years to harvest after approval, with the ability to obtain a two-year extension, all THPs cited may not be completed at this time. Based on aerial maps and on-the-ground observation, however, it appears that SPI is proceeding quickly after approval on harvesting and fully intends to clearcut every acre for which they receive approval.

The term “Clearcutting and other forms of plantation conversion” includes the silviculture methods CALFIRE classifies as clearcutting, alternative (clearcutting), seed tree seed, alternative (seed tree seed), shelterwood removal, and alternative (shelterwood removal). Definitions for these methods can be found in the California Forest Practice Rules.

The counties where SPI owns land that were included in this report are Amador, Butte, Calaveras, El Dorado, Lassen, Modoc, Nevada, Placer, Plumas, Shasta, Sierra, Siskiyou, Tehama, Trinity and Tuolumne. While SPI also owns land in Yuba and Humboldt Counties, that data was not included in the analysis because both counties have seen minimal logging by SPI and were statistically insignificant. Four THPs were approved in Humboldt County, all between 1995 and 1997, for a total of less than 900 acres. Only two were approved in Yuba County, one in 2002 and one in 2006, for a total of 701 acres.

### Endnotes

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- <sup>2</sup> Krankina, Olga. January 26, 2008. “Forest Management and Mitigation for Climate Change-In Search for Synergies.” PowerPoint Presentation. University of Oregon, Eugene, OR.
- <sup>3</sup> Olson, J.S., Watts, J.A., and Allison, L.J. 1983. *Carbon in Live Vegetation of Major World Ecosystems*. Oakridge: Oak Ridge National Laboratory.
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- <sup>5</sup> Ingerson, Ann L. 2007. *U.S. Forest Carbon and Climate Change*. Washington, D.C.: The Wilderness Society.
- <sup>6</sup> Wayburn, L., J. Franklin, J. Gordon, C. Binkley, D. Mladenoff, N. Christensen, Jr. 2007. *Forest Carbon in the United States: Opportunities and Options for Private Lands*. San Francisco, CA: Pacific Forest Trust.
- <sup>7</sup> Harmon, M.E., S. L. Garman, and W. K. Ferrell. 1996a. Modeling historical patterns of tree utilization in the Pacific Northwest: Carbon sequestration implications. *Ecological Applications* 6: 641-652.
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- <sup>10</sup> California Department of Resources. 2006. *Sierra Nevada Conservancy Strategic Plan*. Auburn, California.
- <sup>11</sup> Union of Concerned Scientists, *Climate Change in California: Choosing Our Future, a Summary of “Emissions Pathways, Climate Change and Impacts on California,”* in *Proceedings of the National Academy of Sciences*, 101:34: 2004.

- <sup>12</sup> Stephens, Scott. 2005. Silvicultural and reserve impacts on potential fire behavior and forest conservation: Twenty-five years of experience from Sierra Nevada Mixed Conifer Forests. *Biological Conservation* 125: 369–379.
- <sup>13</sup> Heiken, Doug. January 26, 2008. “Myth and Facts... Forests, Carbon and Global Warming.” PowerPoint Presentation. University of Oregon, Eugene, OR.
- <sup>14</sup> California Climate Change Center. 2006. *Climate Change Impact on Forest Resources*. California. Battles, J. J., T. Robards, A. Das, K. Waring, J. Gilles, F. Schurr, J. LeBlanc, G. Biging, and C. Simon.
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- <sup>17</sup> Hileman, Bette. April 2002. “Atrazine Disrupts Frog Development” *Chemical and Engineering News* 22, <http://pubs.acs.org/cen/critter/frogs2.html>.
- <sup>18</sup> California Department of Pesticide Regulation. 2005. *Pesticide Use Report*. Sacramento, California. Author.
- <sup>19</sup> Ingerson, Ann L. 2007. U.S. Forest Carbon and Climate Change. Washington, D.C.: The Wilderness Society.
- <sup>20</sup> “Selection” is a form of uneven aged management. Uneven aged management is defined as:

Unevenaged management is utilized to establish and maintain an unevenaged stand structure. Unevenaged management attributes include the establishment and/or maintenance of a multi-aged, balanced stand structure, promotion of growth on leave trees throughout a broad range of diameter classes, and encouragement of natural reproduction.

Selection is defined under this method as:

**(a) Selection** Under the selection regeneration method, the trees are removed individually or in small groups sized from .25 acres to 2.5 acres.

- <sup>21</sup> Harmon, Mark. Letter to California Air Resources Board. *Comment on Forest Protocols*. [http://www.arb.ca.gov/lispub/comm/bccomdisp.php?listname=forestghg07&comment\\_num=22&virt\\_num=22](http://www.arb.ca.gov/lispub/comm/bccomdisp.php?listname=forestghg07&comment_num=22&virt_num=22)