Testimony of
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Chairman Markey, Ranking Member Sensenbrenner and members of the Select Committee, thank you for the opportunity to give testimony on this important topic covering forests and climate change. My name is John A. Helms, Professor Emeritus of Forestry at the University of California Berkeley where I served as Head of the Department of Forestry and Resource Management. I am here today representing the Society of American Foresters for which I served as President in 2005. The Society has 15,000 members who are forest managers, consultants, academics, and researchers and promotes sustainable forest management for balanced and diverse values.

Importance of Forests in Sequestering Carbon

The role of the world's forests is critical when considering ways to address the rise in atmospheric carbon dioxide levels and potential climate change. Globally forests, both above ground and in the soil, store fifty percent more carbon than is in the atmosphere. Forests are better at storing carbon than any other land cover. US forests sequester about 200-280 million tons of carbon per year, which offsets about 12-20% of US greenhouse gas emissions and is equivalent to the amount of greenhouse gases emitted by about 235 million cars annually. It is therefore critically important to stabilize, or preferably increase, the world's forestland base. However, to the contrary, the world has a net loss of about 45 million acres of forest per year. Even in the US we lose about 1 million acres per year to development, although some of this loss is offset by reforestation.

In particular, deforestation, especially in the tropics, is a primary source of carbon emissions – second only to emissions from burning fossil fuels – which is why deforestation is such a central issue.

Forests won't solve the greenhouse gas problem, but should play an essential role in any strategy or policy and provide time to allow for other mechanisms to be developed such as alternative energy sources.

Impact of Global Warming on Forests

Forests have evolved over millions of years in association with many past changes in climate. Though forest makeup and distribution seem static relative to human life spans, their natural ranges are transient and temporary in geological time. Of particular concern is that ice core evidence suggests that past climate changes have often been remarkably quick – in some cases in the order of a couple of decades. Consequently there is some immediacy in considering the need to take action regarding increasing carbon dioxide levels. However,

effects of climate change can be both beneficial and detrimental depending on the particular species and time frame being considered. Warmer temperatures will cause range of species to move up in elevation and northward in latitude, thus the US may lose forests in southern latitudes. Ecosystems in cooler and alpine areas are probably the most threatened. Details of the effects of potential climate change on species mix and timing of growing season are currently quite unpredictable. But broadly speaking the distribution of forests, shrubs, and grasslands will change as they have in the past. The effects will be most pronounced in areas of little topographic diversity. In particular, increased soil temperature will likely release a proportion of the large amounts of carbon stored below ground.

The likely effects of climate change on forest insect and disease populations is largely unknown, however it is believed that many of these populations are held in check by cold winters. To the extent that climate change causes a hotter drier climate it will likely stress forests, making them more vulnerable to insect and disease outbreaks. Similarly, warming trends are likely to adversely affect freshwater fish, especially salmon, that require cool streams.

Of critical concern is the effect of warming conditions on the nation's water supplies, a large proportion of which comes from forested watersheds. Precipitation in the form of rain will increase and snowpacks will decrease and it is not clear how this will affect supplies of water to population centers and agriculture areas.

Another major issue is wildfire. Although already at catastrophic levels, if the climate becomes warmer wildfires will become more frequent and intense. In 2006 wildfires in the US burned nearly 10 million acres, cost $1.9 billion to suppress, and were 166% greater in extent than the previous 10-yr average. It is estimated that, depending on forest type and intensity, and in addition to destroying a priceless natural resource, a wildfire emits up to about 100 tons of greenhouse gases, aerosols, and particulates per acre. Future fires are likely to be more severe, cost more to suppress, and have greater impacts on air and water quality, wildlife habitat and infrastructure. Current estimates show that 180 million acres of federal land in the US are at an unnaturally high risk of catastrophic wildfire. At present, harvest levels on national forests are about one-eighth of the growth resulting in forests that are overly dense and fire prone. In Oregon, tree mortality on federal lands from insects, disease, and fire is reported to be six times the level of harvest. Though there is some debate, it is generally agreed that continuation of this situation will not lead to healthy, sustainable forests that store carbon and serve the national interests.

Role of Forests in Stabilizing Green House Gases

The highest priority national issues are to reduce wildfire, stabilize forestland base, and limit forest conversion, development, and parcelization. The current divestment of huge areas of industrial forestlands to investment and real estate firms introduces considerable uncertainty regarding the long-term stability of the forestland base. Any forest carbon strategy must seek to maintain forest ecosystems with a balance of age classes at the landscape level from regeneration to old growth. Emphasis must be placed on maintaining forest health using thinning to avoid overstocking that increases mortality from drought, insects, disease, and

wildfire. When catastrophes occur, these areas, unless in parks or reserves, should be promptly regenerated to ensure rapid restoration of forest cover.

Forests have added value in providing a renewable source of wood products upon which our standard of living depends. Use of wood should be enhanced because life cycle assessments show that using wood for construction and housing uses far less energy and has a much lower "carbon footprint" than structures built with steel, plastic, or aluminum. These alternatives require as much as 250 percent more energy to produce than an equivalent amount of wood product, and they are not renewable.

In addition, there are new opportunities to use sustainably produced woody biomass for power generation and biofuels. It is also evident that woody biomass obtained by reducing wildfire hazards, through thinnings, could be used to produce cellulosic ethanol which is preferable to growing corn that requires considerably greater energy inputs and land area. Developing woody biomass to its potential will require establishing an even playing field with other renewables such as wind and geothermal, both of which receive twice the Section 45 Production Tax Credit than does biomass. Providing tax parity for biomass will greatly help to increase investment in renewable energy while providing new revenues for treating hazardous fuels and reducing the fire hazard on our forests.

Much of the nation's forestlands are already managed sustainably by a diverse mix of owners that include state, industrial, non-industrial family, and Tribes as indicated by their meeting certification standards or state forest practice regulations. Thus forest management is already contributing significantly to sustainable carbon sequestration.

However, to stimulate the sequestering of carbon into forest management scenarios there needs to be stable, market-based mechanisms and incentives. Nation-wide cap-and-trade or carbon tax programs are being debated and considered and would likely influence the role of forests in carbon markets. In the absence of federal programs, several states and regions such as the 10-state Regional Greenhouse Gas Initiative and the California Climate Action Registry have instituted voluntary regional programs. In addition, programs have been developed both in the US and in other countries that use forests to sequester and store carbon to offset losses to development.

As these programs develop there is need to provide technical assistance and incentives for landowners to incorporate carbon-sequestration and storage in their management strategies. On national forest lands there is an urgent need to overcome the so-called federal "analysis paralysis" where land management decisions are made by litigation and layers of regulation rather than through decisions by resource professionals in a timely manner with public input.

Importance of Forest Management Rather than Leaving Forests to Nature

Currently the US imports thirty six percent of its wood consumption from other countries, some of which have far lower environmental standards and often may incorporate illegal logging. At issue is whether excessive restriction of harvesting on national forests is promoting excessive harvesting elsewhere. The basic need is to enhance forest health, which

can be done by prudent thinnings that remove hazardous fuels while both effectively storing carbon and providing wood products that the nation needs.

Although there is debate on this issue, it seems clear from modeling studies that, in the long run, managed forests that incorporate a sequence of harvests result in more carbon sequestered than a forest left unmanaged. This is because young forests are more efficient in carbon sequestration. Old forests store more carbon, but as they age the net uptake of carbon dioxide can diminish to zero as carbon lost in respiration and decomposition becomes similar to the rates of carbon uptake. Harvesting, of course, results in an immediate decline in carbon storage, but the significance of this depends on considering spatial and temporal scales, the fate of carbon in the various harvested products, and the environmental and carbon costs of using alternative products, as noted above, that require far higher amounts of energy for manufacture.

There is no "best" approach to managing forests for carbon sequestration as the type of management used depends on ownership objectives, tree species, and site productivity. But over-arching principles include maintaining canopy cover, prompt regeneration, thinning, and longer time between harvests. It should be remembered, however, that managing to promote carbon storage in forests is likely to be associated with lower outputs of some other desired values such as wood, water, wildlife diversity, and other ecosystem services. Decisions on mix of outputs and values from forests will depend largely on economic values and incentives.

What's Needed

In considering the relation of forests to possible warming trends and to promote the use of forests for carbon sequestration, storage, carbon offsets, and mitigation banking, there is need for revised thinking on the development of public policies that encourage these new activities.

First, we need to enhance observation and monitoring of changes in ecosystem dynamics in relation to potential climate change. We need improved models that can test the likely effects of management for carbon sequestration on other forest values and uses needed by society.

We need to provide incentives to landowners who already manage forests sustainably to add carbon sequestration as a management goal. We need uniform and equitable forest policies and protocols that provide the means of determining additionality, inventory, permanence, verification, leakage, and adequately account for the role of forest products in meeting societal needs from paper to long-term structures and recycling.

Conclusion

Forests are unique in that no other means of sequestering or offsetting carbon has the added benefits of providing clean water, biodiversity, clean air, wildlife habitat, aesthetics, and needed products. Thus it is essential to include forests in any strategy to combat global climate change.

Prime focus must be placed on developing balanced and sound national land use policies and market incentives that enhance forest management and conservation and adequately address both domestic and global issues.

Sequestering carbon and sustaining healthy forests capable of adapting to possible climate change should be common cause of society, forest industry, and conservation groups.