

## Testimony of Lynn Jungwirth

For the  
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Committee on Natural Resources  
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“The Role of Federal Lands in Combating Climate Change”  
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I'd like to thank the committee for the opportunity to provide testimony at this important hearing. My name is Lynn Jungwirth and I am the Executive Director of the Watershed Center, a small community forest organization in the town of Hayfork, which lies in the middle of the Trinity National Forest in California. Since 1993, my organization has worked at the nexus of healthy forests and healthy communities. I'm privileged to work with the “Rural Voices for Conservation Coalition”, a group of over 40 organizations working in local community forestry activities in the west. My organization is also a member of the Nature Conservancy's “Fire Learning Network” designed to help restore fire adapted ecosystems and create fire adapted communities. My testimony will include both my experiences working in the Trinity Forest and lessons from the broader experiences of my colleagues who work in Oregon, Washington, Montana, Idaho, New Mexico and Colorado. We have worked diligently over the past 15 years to promote the hard work of restoration and stewardship of national forest lands by doing the even harder work of multi-stake holder collaboration and partnership with the federal agencies.

First, I'd like to thank you for taking leadership in acknowledging and examining the natural resource aspects of climate change. Your federal land communities have been proactive partners in figuring out how to protect the conservation gains of the past 30 years in the face of climate uncertainty. Rural communities and landscapes need your attention in preparing for the impacts of climate change. And yet, they can also play a significant role in reducing greenhouse gas emissions. Through this testimony, I attempt to offer lessons from rural landscapes and communities regarding the role of national forests in combating climate change.

Climate change discussions in the U.S. have been framed by the approaches and agreements that came out of international negotiations of the United Nation's Framework Convention on Climate Change. These approaches have been dominated by an urban, industrial perspective that focuses on transportation, electricity generation, and large-scale manufacturing as the major sources of anthropogenic (man-caused) greenhouse gases and seeks to reduce emissions from those sources as the pivotal strategies for combating climate change. The rural, natural systems perspective is somewhat different,

perhaps because rural communities and landscapes are experiencing the ecological stresses of climate change, including insect pandemics, intense wildfires, degraded fisheries, invasive species, and ecosystem conversion at an observable rate. We don't actually need the scientists to measure the change in climate; we are living it. We see the changes on the landscapes, the issues for forest management and policy, and we are helping develop responses and solutions. However, the way we see the issues and the solutions don't neatly fit the urban-industrial intellectual construct or the existing policy mechanisms or carbon markets.

Urban citizens, of course, are experiencing the effects of climate change in their communities—through increased temperatures, urban heat islands, air conditioning bills, and air pollution—as well as through increased stresses on their urban forests, primarily insects and disease. Urban communities, however, will also experience the effects of climate change on rural landscapes through reduction of water quality and quantity, the growing taxpayers' burden of billion dollar fire suppression costs, and the social costs of poverty in public land communities. Urban citizens will soon experience the effects of climate change policy or regulation in higher costs for energy and incentives for energy efficiencies.

The United Nations Framework Convention on Climate Change and the Kyoto Protocol did not address forests for various reasons, such as the difficulty of measuring carbon flux in dynamic natural systems, the long-term benefits of forest systems (relative to immediate benefits of industrial technology change), and the political controversy over whether forests should be included in carbon offset markets. Only afforestation and reforestation were accepted in the initial Kyoto protocol, while a later negotiation following Kyoto accepted forest management improvements and most recently, avoided deforestation.

Progress on forests is being made through the protocol discussions at the international level, as well as in various regional and state protocol, such as those under the Chicago Climate Exchange and the California Climate Action Registry. But the progress is slow and the protocols are having difficulty addressing integrated forest activities, such as thinning forests to reduce wildfire risk and using the small-diameter woody by-products for community-scale bio-energy to offset fossil fuels. Nor do the protocols know how to effectively deal with the environmental and social “co-benefits” of forest activities. While these co-benefits should be seen as providing additional value to society, beyond the direct carbon benefits, they are difficult to measure.

Due to the limited experience with carbon markets and accounting, we are only beginning to learn how to do the hard work of “full life-cycle accounting.” This life-cycle accounting is essential for the carbon markets to function well and critical to helping illustrate that the supply chains of many urban products come from rural economies and rural soil, forests and grasslands.

### ***Reducing Greenhouse Gas Emissions***

There are five strategies outlined in the McKinsey and Co. 2007 report “Reducing U.S.

Greenhouse Gas Emissions: How Much at What Cost?" They are listed with their abatement potential:

1. Increasing energy efficiencies in building and appliances – 710 to 870 megatons
2. Increasing fuel efficiency in vehicles and reducing carbon intensity of transportation fuels – 340 to 660 megatons
3. Pursuing various options across energy intensive portions of the industrial sector- 620-770 megatons
4. Expanding and enhancing carbon sinks- 440 to 590 megatons
5. Reducing the carbon intensity of electric power production –800 to 1570 megatons

We can expand and enhance carbon sinks through stewardship activities on public land. In fact, the McKinsey report offers active management of our private forestlands as the least cost alternative available to the United States. Healthy, resilient forests sequester carbon. In the Trinities, we started 12 years ago, thinning overstocked stands both for hazardous fuels reduction and to improve the quality of the spotted owl habitat. Subsequent measurement has show increased growth rates in the remaining trees. The carbon sink is increasing. What is not so obvious is that forest restoration can also provide biofuels for transportation, reduce carbon intensive energy use in the industrial sector through combined head and power biomass plants, and reduce the carbon intensity of electrical power by co-firing coal plants with wood pellets and using woody biomass for electrical generation (a common strategy in the European Union). Four of the five strategies in the McKinsey and Co. report can be addressed through forest stewardship activities.

### ***Climate Change and Wildfire: Social, economic and environment issues***

There is no discussion in the McKinsey and Co. report on the GHG emissions from wildfire. However, some studies suggest wildfire and forest burning account for about 30% of global GHG emissions. Here in the United States, we average about 100,000 wildfire starts a year. About 50% of those are from human activity, about 50% from lightning. The precise quantification of GHG emissions from wildfire is still in debate. The California North Coast Air Quality Management District used Air Resources Board methodology to estimate the GHG emissions from two fire events in Trinity County – the 2002 Megram Fire (100,000 acres) and the 2008 Trinity Fire Complexes (200,000 acres). The estimates were 1.5 million vehicle year equivalents for the Megram Fire and 2 million vehicle years for the 2008 Trinity Fire. Vehicle years provides an urban frame for GHG emissions. For rural communities, however, the frame is weeks of smoke so thick you can't see across the street, increased chronic obstructive pulmonary disease (COPD) in our elders, salmon streams full of sediment, rivers and ponds filled with debris, the decline of our tourism/recreation industry, the loss of our precious timber resources, and, this year, the death of 11 firefighters. These are not the fires of our childhood when low intensity fires would "skunk around" in the undergrowth, herded by local ranchers and the Forest Service. Those fires were fires of renewal. Today's fires are those of ecological, social and economic destruction.

### *The Trinity Forest*

The Trinity Forest is in the Northwest Forest Plan for the Recovery of the Spotted Owl. The primary driver of management activities in the Trinity Forest is preserving biodiversity, especially those species associated with old growth forests. The Spotted Owl plan led to a dramatic reduction in logging and the subsequent destruction of our economy (today the unemployment rate in Hayfork is 21.3%). At that time, (the early 1990s) the theory was that a forest protected from logging and a landscape of reserves and corridors would protect the species. Today, Jerry Franklin and Norm Thompson, the architects of that plan, encourage management in these vulnerable dry forests to reduce fire intensity and protect old growth forests. Their subsequent studies have shown increasing die-off in old growth stands due to changed hydrology. In 15 short years, climate change has dramatically changed strategies for endangered species recovery and old growth protection.

The forest restoration activities done today in the Trinity Forest are often called hazardous fuels reduction, but are actually much more sophisticated than a simple fuels prescription. Care is taken to enhance wildlife habitat, protect fire resistant trees, and minimize soil compaction and disturbance. Experience (and science) has taught us that the initial thinning must be followed by a prescribed fire and the area must be maintained by periodic burnings overtime. While these thinning and burning activities themselves produce some CO<sub>2</sub> equivalents, recent studies indicate that such pre-treatments can reduce the CO<sub>2</sub> equivalent emissions of intensive wildfire by up to 70% in some stands. There is still much debate among the scientific community as to the carbon abatement values of such forest management (because of the carbon released during the thinning and prescribed burn and the uncertainty about whether treated areas will actually experience wildfire within a number of years). However, there is little debate (and significant evidence) that such treatments reduce the intensity and often stop, wildfires.

There is, likewise, debate regarding the removal of fire-killed vegetation after one of these fire events. The concern is that such "logging" negatively impacts the soil carbon and soil productivity. The people of Trinity County have now experienced "re-burns" in areas where fire-killed trees were not removed after the 1987 and 2000 fires. When stands of fire-killed trees dry for 8-20 years and then burn again, the fire is intense and resistant to control. The soil volatilizes along with the trees. There is no question that nearly 90% percent of the tree carbon and most of the soil carbon is released in this second burn. Ecosystem conversion often follows. The forest moves back to meadows, then brush fields and then, burning again, remain in brush. In the words of Tom Jimmerson, an experienced forest ecologist who lived and worked in the Trinity Mountains and Coast Ranges of California for years, after studying a re-burn in the Siskiyou Mountains, "We just blasted this area back to the stone age." Some have said it would take significant investment in rehabilitating these sites, once they have been converted, if we want to reforest them.

A few cases studies were examined in a 2007 report for the California Energy Commission. In “Biomass to Energy: Forest management for wildfire reduction, energy production, and other benefits” the authors (Ganz, et al) modeled thinning, transporting, and converting biomass into electrical power in the Sierras and compared those models to the “no-treatment” models. Their findings show clear life cycle climate change benefits, including a 65 percent net reduction in greenhouse gas emissions. They also show a 22 percent reduction in the number of acres burned by wildfire and a dramatic drop in fire severity, showing a \$246 million savings in wildfire damage and \$13 million in fire suppression costs. They predict that even greater reductions could be anticipated by strategically locating thinning projects in areas of high hazard. They also showed that about \$1.58 billion in power revenues, assuming an 8.3 cent kilowatt hour with a negligible amount of fossil fuel consumed in the harvest and production of that power.

This study points to the cross sectoral benefits of federal forest restoration: Jobs, renewable energy, reduced fire suppression costs, reduced resource damage and protection of wildlife habitat and carbon sinks. It helps us begin to put a frame of “ecosystem services” around federal land management. I believe it is this larger frame (which will include climate change mitigation) that should and will be the driver for federal land management for the foreseeable future.

### **Carbon Markets**

For the purpose of carbon markets, there is great uncertainty regarding forests in general and their “quantify-ability” regarding carbon. The scientific community is careful to bracket their numbers regarding forest ecosystem carbon above and below ground with the caveat “within the limits of current measurements”. Likewise, estimates of fire CO<sub>2</sub> emissions are hampered by our lack of knowledge about carbon deposition, rates of atmospheric vs. soil incorporation of dead wood carbon, ‘real’ soil loss, among other more esoteric topics. Undoubtedly, numerous conventions for forest carbon and forest carbon emissions from wildfire will abound over the next few years as better minds than mine tease out these important details. The CCAR in California is taking the lead on this and their work is enlightened and inspiring.

In most cap-and-trade approaches, forests do not fall under the cap, but they are still very important as “sinks” that sequester and store carbon and as “sources” that emit carbon (through wildfires, conversion, certain management actions, and mortality). Forest projects that sequester and store carbon or reduce emissions have been considered as carbon offset projects, but appropriate protocol for forest-sector offsets have been difficult to agree upon, partially because of the technical difficulty in applying “industrial” protocol to natural or biological systems and partially because of disagreement among policy interests. However, protocol such as the CCAR are moving forward through transparent, multi-stakeholder, working group processes. Currently, forest project options are limited to reforestation, conservation management, and avoided conversion, but the working group is trying to develop accounting approaches for appropriately quantifying carbon in harvested wood products.

One of the major protocol challenges is trying to account for the emissions benefits of integrated, cross-sectoral projects, such as forest restoration projects that enhance forest health, reduce wildfire risk and emissions, and provide woody fuels for bioenergy that offsets fossil fuels. (Interestingly, the CCAR has been able to agree to Urban Forest Protocol, but only allow the carbon directly sequestered in trees to be counted, not the avoided emissions associated with the well-documented energy conservation benefits achieved through shading homes and buildings.)

In addition, beyond carbon offset markets, attention is needed to develop forest management strategies that will: 1) help forests and communities adapt to the unavoidable effects of climate change; (We need to do vulnerability assessments at appropriate scales and help communities and agencies understand the management steps we need to take to keep our forests as forests.) and 2) help develop carbon mitigation strategies that public and private landowners can take to manage their forests in ways that will increase sequestration and storage or reduce emissions—even though they may not meet the same protocol being developed by the offsets markets.

Federal policy frameworks (e.g., cap-and-trade) that promote the establishment and trading of carbon credits through markets can help support rural communities. Such frameworks can stimulate entrepreneurial activity and encourage investment in forest-sector projects that provide credible and verifiable carbon benefits, while also enhancing ecosystem services and providing economic development opportunities for rural communities. It is critical, however, for these policy frameworks to:

- 1) encourage broad and diverse participation in forest-sector offset projects,
- 2) ensure that project scale enhances environmental and community economic gains,
- 3) maintain the sustainability of natural resources for future generations, and
- 4) benefit local communities.

### **The Cost (and benefits) of Carbon**

We believe a cap-and-trade system and markets for carbon trading are coming. Our vision is a system of Payment for Ecosystem Services (PES) of which carbon is but one service. We know that water—another major ecosystem service—is on the horizon as a policy issue with potentially huge market values and policy implications. We are also exploring information on “rights-based conservation.” However, those systems are in their infancy and the imperative of climate change effects on our forests are now. So today the great question is the source of the money to pay for federal forest restoration. The by-products of forest restoration and hazardous fuels treatments have little market value to date, largely due to uncertainty of supply.

#### *Carbon offset markets:*

Voluntary markets for carbon offsets, such as the CCAR, will provide additional revenue opportunities to private landowners, as these markets evolve and begin to function effectively. (Market function has a learning curve, as has been learned largely because of the European Union’s Emissions Trading Scheme (ETS). Private landowners will look for innovative ways to participate in these carbon markets, particularly as market credibility grows and as protocol for broad and clear participation is improved.

The RVCC also encourages the participation of public lands in carbon offset markets, so we are pleased to see the recent revision (December 2008) of the CCAR Forest Protocol to allow this. It must be clear, however, that public lands also need additional funding, beyond carbon offsets, for climate change adaptation and mitigation strategies, as discussed below.

#### *Beyond Offset Markets*

For the past ten years, the Rural Voices for Conservation Coalition has brought to congress two fairly detailed discussions: 1) a line-item by line-item analysis of an integrated forest restoration budget, and 2) a proposal for performance measures and accountability that would lead to integrated forest restoration implementation. Moving from appropriated dollars to payment for ecosystem services will take time, but help to foster an investment in services that will contribute to resilient communities and landscapes, while also reducing greenhouse gas emissions.

#### *Traditional appropriations:*

The annual appropriations for the federal land management agencies should continue to support the missions and programs of the agencies, while focusing on how to integrate climate change and other ecosystem services issues and developments into these programs. This is a strategic set of issues for the agencies and policymakers. One day, perhaps, we will see a line item dedicated to integrated restoration with clear direction for its use.

#### *Values/Revenues from Emission Allowances:*

Policymakers should also include a portion of the revenues generated through the allocation or auction of emission allowances under a cap-and-trade system to the forestry programs noted in the RVCC priorities. Forests and natural landscapes represent an important part of our national carbon emissions flux, and they do not fit easily into the urban-industrial framework for carbon offset markets under cap-and-trade. They need additional sources of funding to address the threats of climate change, to capture the mitigation opportunities, and to recognize the essential co-benefits provided by forest-sector projects.

### **Forest Restoration and Rural Green Jobs**

For the past 15 years, my organization and others like it have operated federal forest restoration and hazardous fuels programs. The job creation potential of federal land stewardship and restoration is tremendous. The proper investment of those dollars can create a world class, highly skilled, knowledge based workforce. Management for ecosystem services is knowledge intensive and requires a workforce committed to place.

Those jobs and skills include:

- Ecosystem surveys and data collection;
- data analysis;
- GIS analysis tools;
- collaborative facilitation;
- road stabilization;

- road removal;
- in-stream habitat improvement;
- wildlife habitat improvement;
- riparian protection structures;
- boundary line surveys;
- forest thinning;
- prescribed burning; and
- effectiveness monitoring.

This highly skilled “restoration” workforce can also be cross-trained for fire fighting, increasing the number of locally available, skilled workers for initial attack in fire emergencies. The restoration workforce will be able to put fuels treatments on the landscape to pre-prepare for fire suppression activities and thereby reduce the costs of fire suppression. They will also help in determining the proper use of fire during the year, and help implement those decisions.

Restoring the federal forests of the west, in order to protect and enhance carbon sinks and to make the forest more resilient in the face of climate change has other benefits to rural economies as well. The by-products of forest management (brush, smaller trees, etc.) can provide fuel to replace fossil fuels. But, scale is the issue. A network of small, community-scaled combined heat and energy plants will not require huge investments in transmission lines (up to 3MW of power can be transmitted over local lines). Such facilities also allow a community to diversify its economy, adding dry-kilns, greenhouses and other heat users.

Likewise, as more local renewable power becomes available and as forested landscapes remains green and healthy, other green economy sectors may more eagerly locate in rural America. They will not relocate so easily to a landscape that looks like an ashtray. But, public policy must deliberately limit the scale and the ownership of these facilities. We have seen devastation in local communities from wood energy plants. In the North Eastern United States, for example, large wood pellet facilities replaced aging pulp mills. Not only did these 300,000 ton facilities monopolize the market for local wood, but the pellets were shipped to Europe for co-firing in coal plants. The locals were left with no ownership of the business, less diversity in their economic system, less fire wood for their own heating, and they were not allowed to purchase pellets from the facility. Similar plants are being built in the South West and in my home state of California.

After a forest burns in a stand replacing fire, the adjacent community loses many economic options. When the 1987 fires burned 67,000 acres in the Trinity Forest we recomputed the “allowable sale quantity”. It dropped from roughly 160 mmbf to roughly 40 mmbf. There are few stewardship opportunities in a fire-killed forest, aside from the erosion control efforts immediately after the fire. If the forest is federal, the fire-killed fuels are currently not removed, new trees are not planted, and the land is left to recover without the hand of man. So the community is left with no forest to manage and no forest products for decades. It is in our best interest, for many reasons, to help the forest accommodate fire, and not succumb to it.

Our rural federal lands communities are among the most vulnerable to climate change impacts. Not only is our landscape changing before our eyes, but when the markets kick in, we will disproportionately feel the weight of higher energy markets because our options will be more limited. Higher gas and diesel prices cannot push us to mass transit where no such systems exist. When higher electrical costs encourage increasing the energy efficiency of our homes, tax credits will only incentivize those who pay significant taxes. We are asking for a better solution for rural America. Help *us* be energy independent. Help us turn our forest thinnings into biofuels, heat and electricity. Help our contractors and workers access the work in the woods that improves the carbon sink and protects our forests from fire, insects, and disease. Help us create a network of community scale production facilities for wood pellets and wood energy.

### **Beyond the Trinity Forest**

Community groups throughout the west have been working against the odds to restore America's forests. We helped forge the agreements that led to the National Fire Plan. That agreement included five strategies: Fire Suppression, Forest Restoration (pre-fire and post fire), Hazardous Fuels Reduction, Community Assistance, and Accountability. This integrated approach, which honors all the ecosystem services of the forest, including the service fire can provide, must be the basis of national climate policy as well. It speaks to the larger issue of maintaining our truly "green" infrastructure. Through our work with endless local collaborative groups we have learned that the social process is the key to creating good solutions and meaningful agreement regarding forest restoration. The role of federal lands in combating climate change can be a national policy decision. How to achieve that, while maintaining habitat and economies, must be figured out and agreed to at the ground level. Top down will not work in this instance.

National policy addressing climate change, currently being developed in Congress will have dramatic effects on rural communities and landscapes. Specific components of national climate change policy, such as how resources are prioritized, credit allocation or distribution, offset eligibility, or the opportunity to participate in emerging markets will affect rural communities and landscapes. Therefore, rural communities should have a role in the collaborative development of those policies. Because of the current uneven playing field between urban/industrial perspectives and rural/natural systems perspectives, there are a few principles we'd like you to consider:

1. Federal and state governments should foster the development and dissemination of reliable climate change information and tools to help build public understanding of the issues. Governments should especially help rural communities develop climate change assessments, strategies, plans, and monitoring schemes. We need to learn together and change together.
2. Federal and state climate change policies must ensure that low-income and other vulnerable populations receive assistance with climate change impacts. Needs of the rural poor may be significantly different than those of urban low-income areas.

3. Federal and state strategies for public and private forest land management should integrate climate change considerations within collaborative, landscape-scale restoration efforts.
4. Markets for forest carbon-offsets and ecosystem services should encourage broad and diverse participation, provide access and opportunity for rural communities, and clearly address issues related to project scale, sustainability, and benefits to local communities.
5. Federal and state climate change policies should provide technical and financial assistance to rural communities for capacity building and workforce training to implement both adaptation and mitigation strategies.

### **Ending Statement**

So why should the federal government play a role in helping to address these challenges? And how should you proceed? The lands surrounding these communities are in dire need of integrated management, and there is an opportunity right now, though the investment of economic stimulus dollars, the development of new legislation around fire suppression and climate change, and the significant investment in renewable energy in the United States to think critically and act deliberately in ensuring that actions on federal land are playing a role in climate change adaptation and mitigation.

Climate change and the physical risks of climate change has led us to reconsider all of our federal forest management decisions and strategies on the Trinity Forest. The Trinity Forest is a nice little forest. It is over a million and a half acres in the Klamath Knot, one of the most biologically diverse areas on the planet. Please don't manage it for carbon. Manage it to be resilient. Manage it to prepare for the impacts of climate change. Manage it to be here for another 400 years. If you do, the carbon sink will come. The GHG emissions from wildfire will drop. The biofuels can be developed. The renewable energy will be developed and sustained. The owl and the coho will have a chance at survival. And so will we.