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### 3. MORE ATMOSPHERIC WARMING MAY HARM TIMBER, AGRICULTURE AND ECOSYSTEMS

There's little debate that carbon levels are expected to double from pre-industrial levels by 2050. Many people see that fact as the silver lining of global-warming scenarios because extra carbon is thought to boost food production — commercial greenhouses routinely pump in extra carbon dioxide to make plants more lush for sale.

But a growing body of underreported science shows that doubling carbon makes many plants grow faster, but apparently not better.

Nancy Tuchman, a professor of stream ecology at Loyola University of Chicago, has been studying the effects of doubled carbon levels on the food quality of deciduous tree leaves. Those leaves fall into streams, forming the base of the food chain there.

What she's found is that the trees grow faster with more carbon dioxide, but their nutritional value to the food chain plummets.

The trees gorge on carbon, but they are limited by lower levels of nitrogen in the soil. The extra carbon lets the plants make more phenolics — undigestible compounds that serve as a defense mechanism against leaf eaters. Also, less nitrogen means less grist for making protein, so anything that relies on these leaves for food has to eat more to gain less. Tuchman has documented this diminished nutrition up the stream food chain — from microorganisms and fungi to insects and fish.

This effect has been shown to include many of the foods humans eat, including mainstays such as broccoli and Brussels sprouts, carrots and potatoes, tomatoes and apples. (Wheat, barley and many staple grains appear unaffected.) If carbon levels keep rising, diminished nutrition will likely show up in plant-eating animals as well, including those many animals that humans depend on for food.

Doubled carbon dioxide could also be bad news for timber. Tuchman explains that trees grow faster, but their cell walls are elongated and thinner, translating into weaker lumber.

The science can't be completely definitive. These effects have been shown in controlled experiments, but it could look different — for better or worse — in a complex, planet-wide system.

### 4. MOST AMERICANS WANT TO ADDRESS THE PROBLEM, AT LEAST SOMEWHAT

Tony Leiserowitz, who works with Decision Research in Eugene, has some good news: Most Americans believe global warming is a problem and think the government should tackle it.

Armed with a grant from the National Science Foundation, Leiserowitz surveyed Americans around the country about global warming and policies to curb it.

"I found to my surprise that there was quite strong public support for a variety of national policies," he says. And that support came from all points along the political spectrum.

Three quarters of respondents said they were concerned about global warming, 90 percent said the U.S. should take steps to lower greenhouse-gas emissions, and 71 percent favored shifting the roughly \$5 billion of annual fossil-fuel subsidies to support renewable energy. Eighty-eight percent favored signing the Kyoto protocol, which calls for reducing U.S. carbon emissions 7 percent by 2010, and 76 percent favored reducing those emissions even if developing nations such as China and India don't — the major reason the federal government withheld its support of the Kyoto treaty.

But Leiserowitz found the same people balked when it came to actions that would cost them more personally. He found that 78 percent of respondents opposed a 60-cent gas tax to discourage driving and cut emissions. Only 31 percent were willing to support a business-energy tax that would cost a family of four an extra \$380 per year. A small majority, 54 percent, was willing to impose a gas-guzzler tax that would add \$1,000 to the cost of a \$20,000 car or SUV with gas mileage below 25 miles per gallon.

Despite strong general support, Leiserowitz concludes, "People are a long way from being convinced that they need to personally sacrifice to achieve those goals. I don't think people have a good sense yet of the scale of the problem, or the kinds of commitments that will be required to solve it at the societal level."

His latest NSF grant is to study the effects of *The Day After Tomorrow* on public perceptions of climate change.

### 5. OREGON IS A LEADER IN BATTLING GLOBAL WARMING

There's more good news: Oregon is taking important and ground-breaking strides to lower its contribution to climate change.

In 1997, the Oregon Legislature unanimously required new power plants to reduce carbon emissions 17 percent below the best available technology — or help fund measures to reduce carbon in other ways. The law was the first of its kind in the U.S.; Washington state recently followed with its own version. New power plants basically multiply their extra carbon by a dollar figure set by law. All to date have given that money to Climate Trust, a Portland-based nonprofit, which in turn funds carbon-cutting projects on the ground.

Mike Burnett, Climate Trust's executive director, says his group has put \$5 million into about 10 projects so far, including stimulating wind power in Oregon and planting trees along the Deschutes River. Many other projects are in the Portland metro area, including low-income weatherization, timing traffic signals to reduce idling at red lights and new green buildings. "Some of the most efficient buildings in the world are being built in Portland under our program," Burnett says.

These efforts don't entirely do the job. In fact, Climate Trust is only offsetting about one third of the carbon it's paid to offset, Burnett says, because these projects cost more than the law requires power producers to pay.

Oregon also is participating in regional efforts, and in September 2003 joined forces with the other West Coast states to take combined action. The agreement among the three governors is the second of its kind in the nation, following a 2001 action by governors in the Northeast and some eastern Canadian provincial leaders to tackle climate change after President George W. Bush backed away from his campaign promise to regulate carbon.

Under the agreement, the three West Coast states could begin to implement cap-and-trade schemes for carbon — companies emitting too much carbon could buy credits from companies emitting less. The states also could work together to encourage development of renewable energy, and combine vehicle purchases to green state fleets with hybrid cars and tires that help vehicles use less fuel.

Cities are taking their own initiatives. Portland, Corvallis and a number of Washington municipalities have joined Cities for Climate Protection, committing to cleaning up their carbon act. Eugene didn't join when the opportunity came around four years ago, but Councilman David Kelly says the city is nevertheless doing what it can.

"If you want to start poking holes at this film with the science, you're going to end up with Swiss cheese," says Tony Leiserowitz, a Eugene researcher who has focused on the issue of human-caused climate disruption for more than a decade. But, he adds, "You'll still have cheese; there's still something there, even if there's a lot of holes in it."

In this still from the film *The Day After Tomorrow*, a tsunami floods New York City in the wake of a catastrophic climatic shift.

