



No one can do everything. Everyone can do something.

Join the growing ranks of volunteer citizen scientists by signing up to participate in the [USA-National Phenology Network](#), which aims to vastly increase the data available to scientists and the public regarding the impacts of climate change on plant and animal life cycles. The program provides easy-to-use methods to track and report the life cycles of nearly 200 species of plants, and will begin monitoring animals next year.

<http://www.usanpn.org/>

Hi folks! Beginning next time around, all future editions of the Carbon & ES Update will be released mid-week. Look for it then!

NEWS

NY Times Magazine Green Issue

Earth Day is upon us, but sustainability must be integrated into all that we do. Check out this great edition of the NYTimes magazine, with articles on:

The Working Forest

Why Isn't the Brain Green

The End is Near (Yay!)

Batteries not Included

And more...

<http://www.nytimes.com/pages/magazine/index.html?8dpc>

[Carbon / General]

There's been some big news since the last roundup. The most critical and interesting of these has been 1) the release of Reps Waxman and Markey's energy and climate change legislation "discussion draft" (American Clean Energy and Security Act, ACES, 2009) which includes provisions for a cap-and-trade system, and 2) the EPA's recent "endangerment finding" which cites that CO₂ and other greenhouse gases constitute a danger to public health and are subject to regulation under the Clean Air Act. Which is it then, will GHG reduction be legislated or regulated? Well, the EPA is certainly moving the ball forward, but as EPA administrator Lisa Jackson says herself "legislation addressing climate change would be more effective and inclusive than top-down regulation" and regulation under the Clean Air Act would likely lead to myriad lawsuits. It's an exciting time, stay tuned! Here are some articles and summaries of each development:

EPA Clears Way for Greenhouse Gas Rules

The Environmental Protection Agency on Friday formally declared carbon dioxide and five other heat-trapping gases to be pollutants that endanger public health and welfare, setting in motion a process that will lead to the regulation of the gases for the first time in the United States.

<http://www.nytimes.com/2009/04/18/science/earth/18endanger.html?ref=science>

<http://www.washingtonpost.com/wp-dyn/content/article/2009/04/17/AR2009041701453.html>

<http://www.reuters.com/article/newsOne/idUSN1732459820090417>

<http://www.environmentalleader.com/2009/04/15/epa-nears-endangerment-finding-on-greenhouse-gas-emissions/>

Editorial: A Danger to Public Health and Welfare

In what could be a historic moment in the struggle against climate change, the Environmental Protection Agency on Friday confirmed what most people have long suspected but had never been declared as a

matter of federal law: carbon dioxide and other greenhouse gases constitute a danger to public health and welfare.

http://www.nytimes.com/2009/04/18/opinion/18sat1.html?_r=1

American Clean Energy and Security Act (ACES) 2009:

<http://markey.house.gov/index.php?option=content&task=view&id=3583&Itemid=125>

US Climate Policy: Waxman-Markey "Discussion Draft" – Summary by the Climate Group

http://www.theclimategroup.org/assets/resources/waxman-markey_summary_by_tcg.pdf

Analysis: US Floats 2nd Climate Bill, What's it mean for Trees?

On March 31, US Congressmen Henry Waxman and Ed Markey released the first official draft of the American Clean Energy and Security Act of 2009 (ACESA) covering 85% of US emissions. The emissions cap is more ambitious than expected with 2005 as a baseline: 3% below 2005 levels in 2012, 20% in 2020, 42% in 2030 and 83% below 2005 levels in 2050. Ecosystem Marketplace examines the implications of this bill for the global forestry sector and the race to halt climate change.

http://ecosystemmarketplace.com/pages/article.news.php?component_id=6655&component_version_id=9984&language_id=12

Investors Eye Forestry, Water Opportunities in Tough Markets

US investors have deserted the green investment space, according to analysts and investors speaking at a recent environmental markets conference in New York.

But forestry offset projects are poised to be a major source of investment opportunities amid indications that they will be included in a federal carbon cap-and-trade programme, market participants said, while water projects are set to benefit from major investments from the US economic stimulus package.

<http://www.environmental-finance.com/onlinews/0409wsq.html>

Study reveals potential to amass more carbon in eastern North American forests

With climate change looming, the hunt for places that can soak up carbon dioxide from the atmosphere is on. Obvious "sinks" for the greenhouse gas include the oceans and the enormous trees of tropical rainforests. But temperate forests also play a role, and new research now suggests they can store more carbon than previously thought. (See published paper, listed in Journal Section, below).

http://www.eurekalert.org/pub_releases/2009-04/uow-srp040209.php

US Greenhouse Gas Emissions Rose 1.4% in 2007

On April 15, the U.S. Environmental Protection Agency (EPA) released a report showing overall emissions in 2007 rose 1.4 percent over emissions in the previous year. The annual report *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007* indicated that total emissions for the top six greenhouse gases (GHG) were equivalent to 7,150 million metric tons of CO₂ and that emissions for the country have increased 17.2 percent from 1990 to 2007.

<http://epa.gov/climatechange/emissions/usinventoryreport.html>

Massive Emissions Cuts Can Save Arctic Ice: Study

Cutting greenhouse gases by 70 percent this century would spare the planet the most traumatic effects of climate change, including the massive loss of Arctic sea ice, a study said Tuesday.

http://www.google.com/hostednews/afp/article/ALeqM5i_j81EqlzF_mFE9afZcUyeYzg9RQ

On a related note, battling climate change goes hand in hand with facilitating sustainable development...

Hot and Dry Pinion Pines Drying Fast

Warmer temperatures during periods of drought have proved deadly for trees that grow in the southwestern United States, a new study finds.

Full text at end of article or by subscription here: <http://www.eenews.net/climatewire/2009/04/14/2/>

Third-World Stove Soot is a Target in Climate Fight

"It's hard to believe that this is what's melting the glaciers," said Dr. [Veerabhadran Ramanathan](#), one of the world's leading climate scientists, as he weaved through a warren of mud brick huts, each containing a mud cookstove pouring soot into the atmosphere.

<http://www.nytimes.com/2009/04/16/science/earth/16degrees.html?em>

Brazilian Stakeholders Urge Fed to Go REDD

Farmers, indigenous tribes, and environmental NGOs across Brazil say they need direct payments for reducing emissions from deforestation and forest degradation (REDD) if they are going to help halt climate change, but the federal government remains opposed. Can a new declaration of consensus promote change at the top?

http://ecosystemmarketplace.com/pages/article.news.php?component_id=6659&component_version_id=10003&language_id=12

[Water]

From Carbon Footprints to Water Footprints (Blog)

Over the last couple of years, the idea of reporting carbon footprints for various products, as a way of allowing consumers to make informed choices about the items they buy, has gained wider acceptance. Now there are signs that other indicators — including water-use footprints — appear to be coming into the mix.

<http://greeninc.blogs.nytimes.com/2009/04/17/from-carbon-footprints-to-water-footprints/>

[Bioenergy]

ANR secretary says biomass power could double

Vermont is a national leader in generating heat and electricity from wood chips. And the state's natural resources secretary says Vermont forests have enough capacity to at least double the current output of biomass power.

http://www.vpr.net/news_detail/84620/

[Integrated ES Markets]

Oregon Experiments with Mixed Credits

California and Oregon have long been friendly environmental policy rivals. California has set environmental standards in many areas, particularly air quality. Oregon wrote the first bottle bill, the first state land-use law, and the first state climate-change law. But on the species banking front, California dominates, 94 to 2. An innovative new multi-credit system being pioneered in the Willamette Valley could change the game.

<http://www.willamettepartnership.org/news-and-publications/oregon-experiments-with-mixed-credits/>

Reports:

Report outlines possible effects of warming on California

A draft Climate Action Team Report, an update of a 2006 assessment, compiles numerous research papers that include among the projections up to a fourfold increase in wildfires, reductions in precipitation and snowpack, and agricultural water being transferred to urban uses.

<http://www.latimes.com/news/local/la-me-climate2-2009apr02,0,1696993.story>

<http://www.climatechange.ca.gov/publications/cat/>

Green Carbon Guidebook (WWF, 2008)

This brief report provides an overview of the different standards that are emerging in the rapidly evolving forest carbon market. It offers a meta-standard framework for comparing the different standards and identifies gaps that need to be filled in their further refinement.

http://www.biodiversityeconomics.org/applications/library_documents/lib_document.rm?document_id=1164§ion_id=20

Journal Articles:

Dessai, S., M. Hulme, R. Lempert, and R. Pielke, Jr. 2009. Do We Need Better Predictions to Adapt to a Changing Climate? *Eos*, Vol 90, No. 13, pp. 111-112.

http://sciencepolicy.colorado.edu/admin/publication_files/resource-2720-2009.08.pdf

New Finance for Climate Change and the Environment (Porter et al, 2008)

http://www.biodiversityeconomics.org/applications/library_documents/lib_document.rm?document_id=1163§ion_id=20

Events:

Featured:

Carbon in Northern Forests

Integration of Research and Management

June 10-11, 2009 | Traverse City, MI

www.forest.mtu.edu/cinf

Multiple Wood Using Systems at One Location Webinar

Thursday April 23, 2009 10:00AM EST/9:00AM CT

This webinar will primarily describe all aspects of the pre-feasibility studies conducted, including:

- Raw Material
- Permitting
- Financing
- Markets

Additionally, ownership, structure, site location, site size, site access, and other feasibility factors will be discussed. Don Peterson, Executive Director of Timber Ridge Energy Enterprises, Inc. (TREE) will be the presenter. To learn more about this webinar, please contact TREE at:

tree_dpeterson@sbcglobal.net or 877-284-3882.

Bioenergy North America 2009

April 17, 2009

Chicago, Illinois

<http://www.environmental-finance.com/conferences/2009/BioNam09/intro.htm>

12th Annual National Mitigation and Ecosystem Banking Conference

05/05/2009

Salt Lake City, Utah

<http://www.mitigationbankingconference.com/>

10th National Conference on Science, Policy and the Environment

January 21-22, 2010

Washington, DC

<http://ncseonline.org/conference/greeneconomy/>

2009 Water Quality Standards Academy - Basic Course

May 11-15, 2009

Arlington, Crystal City, VA

www.epa.gov/watershedcentral.

Full Text of Selected Articles:

FORESTS: Hot and dry piñon pines dying fast (04/14/2009)

Lea Radick, E&E reporter

Warmer temperatures during periods of drought have proved deadly for trees that grow in the southwestern United States, a new study finds.

The [research](#), published online in the journal *Proceedings of the National Academy of Sciences*, found that piñon pines, a species found in the semi-arid woodlands of the Four Corners region of the United States, succumbed to drought 28 percent faster when grown in warmer temperatures than trees that grew at a cooler temperature.

"We certainly don't want to be overly alarmist about this," said David Breshears, a professor in the University of Arizona's School of Natural Resources. But he said the study, which he co-authored, has revealed some "'Oh wow' results."

The findings indicate that temperature alone could cause a fivefold increase in the frequency of regional-scale piñon die-off events during more severe and frequent droughts, Breshears said.

"We can't attribute that to climate change," he said. But, he added, "we know warming is going on."

Breshears and his colleagues, in an effort to predict future vegetation changes in response to the effects of global warming, isolated 20 mature piñon pine trees in Biosphere 2, a 3.14-acre glass-encased facility in Oracle, Ariz., that contains various ecosystems, such as tropical rainforests and savanna grasslands.

Carbon dioxide 'starvation'

The researchers chose piñon pines because they are a dominant species found across much of the western United States, and because many believe these trees might be the arborist's version of the canary in a coal mine because of their sensitivity to temperature under drought conditions.

Half of the trees were placed in an area set at a normal temperature for piñon pine trees, ranging from 11 degrees to 24 degrees Celsius (51.8 to 75.2 degrees Fahrenheit). The other half were grown at temperatures slightly more than 4 degrees Celsius (approximately 7 degrees Fahrenheit) higher than these normal temperatures.

Of the trees deprived of water to simulate drought conditions, those grown in warmer temperatures died almost 30 percent faster than trees grown at normal temperatures.

The paper also allowed researchers to get a look at the physiology of dying trees, according to study co-author Henry Adams, a doctoral student in the University of Arizona's Department of Ecology and Evolutionary Biology who conducted much of the experimentation for this study.

In an effort to save water, the trees closed their stomata, or the pores in their epidermis, preventing their carbon dioxide respiration.

"The trees end up dying from carbon dioxide starvation because they run out of resources to fuel metabolism," Adams explained.

To place the findings in context, Breshears compared this study's findings with a severe drought that took place in 2000.

Prolonged droughts and drought cycles

"This drought that we saw in 2000 took about 10 percent of piñon juniper woodlands in the Southwest in the Four Corners," Breshears said.

While the 2000 drought was not the biggest drought event in the last 100 years, it did cause a massive tree die-off, Breshears explained.

"What [the study's] results show is if it gets warmer, all the trees die sooner," he said.

Jim Youtz, regional silviculturist with the Southwestern region of the U.S. Forest Service, has not observed accelerated rates of piñon die-off since 2005, when the 2000 drought ended.

Youtz noted that he has not yet read the new study, but said it makes sense that higher temperatures would have impacts on plants. Still, he said, it is difficult to identify the exact causes of disturbances in Southwestern forests.

"I would say if we had more periods of prolonged drought, then we'd see these huge impacts on vegetation," Youtz said. "Is that going to happen? I don't know," he added.

Factors such as fire suppression as a result of human settlement and forest growth unregulated by frequent surface fire have resulted in "unnaturally dense conditions," making piñon pines, and all tree species, less resilient to insects and drought-caused mortality, Youtz explained.

Historically, many types of piñon pine woodland stands would burn every couple of centuries and slowly regenerate, allowing the wildfires to replace the woodlands once they had matured and become predisposed to conditions such as insect mortality, Youtz said.

It remains unclear, though, whether the 2000 drought is the result of climate change or if it is simply part of a recurring pattern.

"We've had [droughts] just as severe in the 1950s and far more severe in the 1930s, so we really don't know or what to speculate," Youtz said.

Implications of warmer temperatures

What the researchers are sure of is that regional tree die-offs of species like the piñon pine are going to have dramatic effects on the landscape and surrounding ecosystems.

"We see, at a minimum, these types of changes are going to affect land management for decades," Breshears said, adding that even after a large-scale mortality event, it would take seedlings decades to get re-established.

Breshears and Adams see management scenarios as a big challenge.

"It's almost the management nightmare if you think about trying to, from a park service context, to manage a particular area and trying to maintain vegetation and biodiversity there," Breshears said.

Adams said droughts like the one seen in 2000 and in the 1950s, which he described as once-in-100-year events, are going to become once-in-20-year events, affecting surrounding ecosystems and wildlife. That would endanger pine nuts, which come from piñon trees, and are a "really valuable food source" for a number of birds and animals, Adams said.

Furthermore, pests like bark beetles are only going to compound the effects of warmer temperatures during droughts.

This study highlights the "potential for a lot of vegetation change under warmer temperatures, and part of the reason why this is important is because there are still a lot of details that are difficult to predict about how climate is going to change," Breshears said, adding that "these results have a lot of implications."