Engaging a Climate Ready Agency

From Dave Cleaves, Forest Service Climate Change Advisor

DECEMBER 29, 2011

The New Year is just around the corner. Make a resolution to send us an email sharing the details of climate change related research, management activities, and communications in the Forest Service (see submission details in the last section of this update). We'll spread the news through these updates. This will help us learn from each other as we all work to bring climate change knowledge into our organizational expectations and actions.

Don't miss an issue! Sign up for our climate change listserv and we'll send emails to announce when a new update is available on the Climate Change Advisor's website. You can also direct partners to this website so they can sign up for the listserv. (It's not the kind of listserv that will flood you with tons of email.) Previous editions of the updates are also posted on the website.

MESSAGE FROM DAVE

Going to Extremes

This essay is excerpted from a longer version on our intranet site.

The owner of a woodlot, rattled by an ice storm, faces an expensive clean up job, with few markets for the damaged timber. A city faces the cost of dredging silt from its reservoir after intense rainfall erodes a severely burned watershed. Managers of a tribal forest, recently burned over, struggle through an extended drought and shortages of seedlings suited to a drier future. These and similar situations that result from extreme weather events are likely to increase.

Most climate scientists agree that the climate is changing, including increases in the frequency and intensity of extreme weather events. Most of the social, economic, and ecological losses and costs associated with climate change will result from shifts in these extreme events. This changing pattern of extremes is assessed in a forthcoming international report.

The UN's International Panel on Climate Change (IPCC) recently released a summary of its upcoming (February 2012) "Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation" or SREX. Written by 220 scientists from 62 countries, SREX assesses the scientific literature on the observed and predicted changes in patterns of extreme weather. The report also reviews the implications of these events for economic losses and sustainable development.

The new SREX paper is one of many reports in the last few years that have raised the specter of natural disasters caused by weather extremes linked to a changing climate. Studies by the Global Change Research Program (2009), Pew Center on Global Climate Change (2011), NOAA (2011), EPA (2010), and separate analyses by the insurance and reinsurance companies Swiss-Re, Munich-Re, Allianz, and Lloyd's of London have analyzed the increasing economic and personal losses (and insurance payouts) from extreme weather. According to NOAA, 2011 was a record-setting year with 12 weather disasters – drought, heat waves, tornados, fires, and floods - each with at least $1 billion in damages. A Munich-Re study found that the number of natural disasters has tripled over the past two decades.

All of these studies have cautioned against linking single events to climate change, given the strong

role of natural variability and the shortage of high quality, extensive, long-term data. But they have noted that these changing patterns are consistent with the predictions and rationale about human-caused climate change that have been laid out by the majority of climate scientists.

The authors of the IPCC report that the most well-supported trends are for temperature extremes, the lowest for cyclone frequency. According to the report, "A changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events. Many extreme weather and climate events continue to be the result of natural climate variability…. (which will be) an important factor in shaping future extremes in addition to the effect of anthropogenic changes in climate."

The new IPCC report looked at both observed and projected patterns for multiple types of events and at the levels of exposure of people and assets, as reflected in the trends of economic and other losses. They concluded that some human development patterns may not be sustainable without a systematic and sustained approach to managing risks and adapting to a changing exposure pattern. These conclusions also apply to natural resource values in both rural and urbanized areas.

According to the report, "Increasing exposure of people and economic assets has been the major cause of the long-term increases in economic losses from weather- and climate-related disasters. … Vulnerability reduction is a core common element of adaptation and disaster risk management."

The IPCC authors were particularly cautious in evaluating the evidence and their own projections. Only findings that had robust evidence and high agreement among scientists were assigned a label of "high confidence." Limited evidence and low agreement resulted in a label of "low confidence." When the confidence in evidence was high enough, the report also described the likelihood of various trends, in terms such as "virtually certain" (99-100% probability) and "very likely" (90-100% probability). This language allows the reader and decision maker to better understand the relative uncertainty across different types of extremes.

The authors were most certain (ranging from likely to virtually certain, meaning 66% or better probability) about the observed (since 1950) increase of extreme warm days and nights and the corresponding decrease in cold extremes, increases in heavy precipitation events and proportion of total precipitation in these events, and coastal flooding from sea level rise. The report projected that the temperature extremes will continue to increase (virtually certain) with extremes that normally occur once every 20 years occurring once every 10 to once every 2 years in the future. Heat waves are "very likely" to increase in frequency, length, and intensity over most land areas. One-in-twenty year precipitation events are projected (very likely) to be more common, perhaps 1-in-15 to 1-in-5.

The lion's share of the total impact from all fires, insect infestations, floods, droughts, and other events, is the result of a small number of these events. And the patterns of these events appear to be changing. Regardless of the differences of opinion about the roles of human activity and natural variability in climate change, we land managers need to better understand what types of extremes are increasing, what risks they impose, and how we might manage to minimize losses and costs. The new IPCC and other reports encourages us to review and perhaps revise some of our investment priorities in response to a growing body of evidence about changing patterns of extremes.

The essay continues on our intranet site.

FROM THE WASHINGTON OFFICE

US Forest Service leads delegation to Asia-Pacific Economic Cooperation Meeting

Associate Chief Mary Wagner led the US delegation to China in September for the first Asia Pacific Economic Cooperation Ministerial Meeting on Forests that focused on the role of forests in green growth, sustainable development, and climate change. Read more in the International Programs newsletter.

Forest Service climate change response featured on EmeraldPlanet Television

Dave Cleaves discussed the FS climate change response on a September program of The EmeraldPlanet. Topics included FS research and actions on climate change, the Performance Scorecard, and adjusting to climate change and opportunities for private landowners. You might actually be able to watch the program online if you aren't on a Forest Service internet connection.

Heating with Biomass Briefing

David Atkins, Woody Biomass Program Manager, spoke at the Environmental and Energy Study Institute briefing on Capitol Hill about how heating with biomass can contribute to job creation, economic development, and energy security in communities across the country, as well as ways in which policies can help overcome some of the existing challenges and barriers to biomass use in residential, commercial, and institutional sectors. Presentation materials are online.

Climate Adaptation Plans for Communities

Elizabeth Reinhardt of the Climate Change Advisor's Office represented the USDA at the Environmental Justice Leadership Forum Roundtable on Climate Change coordinated by EPA. Several other federal agencies including the Departments of Energy, Commerce, and Health and Human Services discussed their environmental justice strategies and possible next steps in addressing environmental justice. The USDA and other agencies' environmental justice strategies are available for public comment. See more on FS environmental justice efforts on our intranet site.

FROM THE FIELD

Sustainable Practices Video

The Greater Yellowstone Coordinating Committee and its sustainable operations subcommittee created a video for employees of the Greater Yellowstone Ecosystem to encourage sustainable practices in the workplace. The video's two versions, one with subtitles and one without, is at O:\NFS\BridgerTeton\Program\2700SpecialUsesMgmt\JKRD\2720Administration\d4\deedee\GYCC SOS Video.

Symposium on Coastal Temperate Rainforests

The Tongass National Forest and FS Alaska Region are among the sponsors of a symposium hosted by the Alaska Coastal Rainforest Center on Coastal Temperate Rainforests: Integrating Science, Resource Management, and Communities. Keynote speakers and international plenary sessions will address interacting systems, ecosystem services, conservation across borders, resource planning and management, public policy, and education. The symposium begins with a field trip to Berner's Bay on April 17 and continues in Juneau, AK, April 18-19, 2012.

Science Delivery on Climate Change: An All-lands Approach

Chris Swanston of the Northern Institute of Applied Climate Science (NIACS), in a presentation to the WO, described some of the documents, tools, and other resources that NIACS has created to assist land management decision-making. NIACS is a multi-institutional partnership of Forest Service, university, industry, and conservation members in the north-central and northeastern US that focuses on issues related to climate change, carbon, and bioenergy. This presentation also highlighted the use of partnerships in creating and disseminating resources.

Addressing social vulnerability to climate change

In November, a research team, led by Dan Williams (RMRS) and Laurie Yung (University of Montana), convened a research-management workshop on social vulnerability in the context of natural resources. FS R&D, NFS, and S&PF staff and DOI and university social and natural scientists identified three priorities: conduct a social vulnerability assessment case study for one national forest to serve as a template for other forests, develop a multi-scale research project to improve basic knowledge about community vulnerability and best assessment methods, and develop a communication and outreach plan. Read more at our intranet site.

Chippewa and Superior National Forests build management & science partnerships on climate change

Climate change and Minnesota forests were the focus of two separate events held in Grand Rapids, MN, in October. The Minnesota Forest Resources Council (MFRC) convened a Northern Summit with representatives from 3 Regional Landscape Committees in northern MN. The Chippewa and Superior National Forests participated along with 45-50 attendees including non-industrial private landowners, private companies, county forests, conservation NGOs, tribal representatives, MN DNR employees, and others. The Northern Institute of Applied Climate Science (NIACS) was also a participant, leading discussions on the Climate Change Response Framework, and soliciting input on how the project can help forest managers incorporate climate change considerations into management. Both National Forests in Minnesota are active participants in the Landscape Planning process coordinated by MFRC, which will now include a greater focus on climate change adaptation. Following the Northern Summit, staff from the Boreal Forest and Community Resilience Project led a Science Roundtable in which over 25 professionals from National Forests, NRS, MN DNR, academia, tribes, and private companies examined potential changes in Minnesota forests. Using systems mapping techniques, the group focused on 4 common forest types in northern MN. Results of the Science Roundtable will contribute to an Ecosystem Vulnerability Assessment for northern MN, which is being organized by NIACS.

Presentation at Northern Great Lakes Visitors Center

Patricia Butler of Northern Institute of Applied Climate Science (NIACS) hosted a public presentation titled "Wisconsin's Climate: Keeping Pace with Change" in November at the Northern Great Lakes Visitor Center. About 60 people attended the presentation, which provided information on how forests may respond in the future to climate change. Patricia also described ongoing efforts in the region to help ensure that forests remain healthy and productive. This presentation complemented the Visitor Center's new exhibit, which features the potential social impacts of climate change on the Ojibwae culture as well as the effects on all people who reside in the Great Lakes region. The event was featured on November's Ecotopia: Forests and Freshwater, a radio program that aired on both WRNC and WPR stations in Superior and Ashland.

Invasives, Climate Change, and Forest Management

The Entomological Society of America's annual meeting included a symposium featuring RMRS research entomologists highlighting current FS research addressing threats to forest ecosystems in North America. Ann Lynch addressed the response of insects to climate change in Southwestern high elevation ecosystems, Justin Runyon spoke on herbivore-induced plant defenses and biological control of invasive plants, Sharlene Sing presented "Hybrid Weeds and Agent Genotypes: Factors Confounding Biological Control of Weeds", and Barbara Bentz co-authored a presentation on causes and consequences of mountain pine beetle outbreaks, given by PSW's Chris Fettig.

A Simple Tool for considering climate change

Region 5 has a "Simple Way to Consider Climate Change Using a Simple Tool" put together by Mike Landram, Regional Silviculturist. The tool is a GIS geodatabase containing climate information. A document describing how to access the tool gives three examples for using it to adapt silviculture and planning in response to climate change at a particular site. More tools and information about climate change considerations are on the R5 Climate Change Considerations and Ecology/Climate Change Intranet sites. Joe Sherlock, R5 Siliviculturist, reformatted data from the Pacific Southwest GIS Clearinghouse, RMRS's Nick Crookston provided temperature and precipitation data, and Mike got additional data from the R5 Remote Sensing Lab.

OTHER EVENTS AND OPPORTUNITIES

Climate Change Vulnerability Index

Bruce Young of NatureServe will demonstrate the Climate Change Vulnerability Index on January 19, 1 pm ET. The Index assesses the relative vulnerability of plant and animal species to the effects of climate change (e.g. range contractions, population reductions) using readily available information about climate predictions and species' natural history, distributions and landscape circumstances. This webinar will describe the concepts used to develop the Index, and the climate data sources it draws upon, and the specific assessment factors. It will also demonstrate the use of the assessment and highlight a variety of ways in which it has been applied. Learn more or register for this webinar.

2012 National Tribal Forum on Air Quality

Co-sponsored by the Institute for Tribal Environmental Professionals (ITEP) and the National Tribal Air Association in partnership with the EPA, the forum on May 22-24, in Tulsa, OK, will include both plenary and breakout sessions. Proposals for presentations in the areas of Ambient Air Quality, Indoor Air Quality, and Climate Change are encouraged. Tribal leaders, environmental staff, scientists, policy developers, and representatives from tribal colleges, universities, federal, state, and local agencies, and other interested parties involved in research or projects that pertain to air quality or climate change are invited to submit an abstract of their presentation by February 1. More information will be available on the ITEP website soon.

CLIMATE CHANGE RESOURCE CENTER (CCRC)

New topic pages on warmwater fauna and insect disturbance

The CCRC features revised, updated, and NEW Topic Pages, which cover information on a variety of natural resource subjects written by experts in the field. Two pages have been launched this month. The Warmwater Fauna page describes the challenges to warmwater environments that are being

exacerbated by climate change, and management options for increasing the resilience of aquatic ecosystems. The Insect Disturbance page discusses some of the complex relationships between climate, insects, and host trees and what this means for forest managers. As always, if you have feedback for the CCRC on these or other resources, please don't hesitate to contact the production team at ccrc@fs.fed.us.

RECOMMENDED READING

Bioenergy production systems and biochar application in forests: potential for renewable energy, soil enhancement, and carbon sequestration

McElligott, Kristin; Page-Dumroese, Deborah; and Coleman, Mark.

Bioenergy production can reduce wildfire hazard fuel while producing a useful source of renewable energy. However, biomass removals raise concerns about reducing soil carbon and altering forest site productivity. This review evaluates the potential for mobile bioenergy systems and the environmental implications of biochar application in forests. Using forest biomass that accumulates annually during forest harvest operations, bioenergy can be produced on-site and the biochar that is generated can be redistributed to return nutrients and help improve water holding capacity of the site. Little is known about the short- and long-term impacts of biochar application in forest ecosystems. Some sites may benefit from biochar application, while others show no or negative responses. Field studies on soil and vegetation responses combined with laboratory studies will elucidate the best sites for biochar application and sustainable bioenergy production.

Bringing indices of species vulnerability to climate change into geographic space: an assessment across the Coronado National Forest

Jennifer E. Davison, Sharon Coe, Deborah Finch, Erika Rowland, Megan Friggens, and Lisa J. Graumlich

Indices that rate the vulnerability of species to climate change in a given area are increasingly used to inform conservation and climate change adaptation strategies. These species vulnerability indices (SVI) are not commonly associated with landscape features that may affect local-scale vulnerability. To do so would increase their utility by allowing managers to examine how the distributions of vulnerable species coincide with environmental features such as topography and land use, and to detect landscape-scale patterns of vulnerability across species. This study evaluated 15 animal species that had been scored with the USFS RMRS's system for assessing vulnerability of species to climate change. Vulnerability scores were applied to each species' respective habitat models in order to visualize the spatial patterns of cross-species vulnerability and to identify the considerations of spatially referencing such indices. The study shows that it is simple and constructive to bring species vulnerability indices into geographic space: landscape-scale patterns of vulnerability can be detected, and relevant ecological and socioeconomic contexts can be taken into account, allowing for more robust conservation and management strategies.

Climate change effects on stream and river temperatures across the northwest U.S. from 1980-2009 and implications for salmonid fishes

Isaak, D.J., Wollrab, S., Horan, D., and Chandler, G.

This publication documents rates of warming across the northwest's streams from long-term monitoring records. The research concludes that water temperatures are warming. Rates vary seasonally and correlate most strongly with air temperature trends rather than with discharge. Continuation of warming trends this century will increasingly stress important regional salmon and

trout resources and hamper efforts to recover these species, so comprehensive vulnerability assessments are needed to provide strategic frameworks for prioritizing conservation efforts. More extensive monitoring efforts are needed so that spatial and temporal patterns of warming can be better understood.

Federal Actions for a Climate Resilient Nation: Progress Report

CEQ Interagency Climate Change Adaptation Task Force

This report provides an update in five adaptation areas that align with the policy goals set forth by the Task Force in 2010, including: integrating adaptation into federal government planning and activities, building resilience to climate change in communities, improving accessibility and coordination of science for decision making, developing strategies to safeguard natural resources in a changing climate, and enhancing efforts to lead and support international adaptation.

Priorities for Managing Freshwater Resources in a Changing Climate

CEQ Interagency Climate Change Adaptation Task Force

This National Action Plan provides an overview of the challenges that a changing climate presents for the management of the Nation's water resources and recommends actions for Federal agencies to support water resource managers in understanding and reducing the risks of climate change.

A U.S. Carbon Cycle Science Plan

A Report of the Carbon Cycle Science Steering Group and Subcommittee, Anna Michalak, Rob Jackson, Gregg Marland, Chris Sabine, Co-Chairs

The development of this new 2011 Plan was initiated by the U.S. Carbon Cycle Interagency Working Group and the Carbon Cycle Science Steering Group, and outlines a strategy for refocusing U.S. carbon cycle research based on the current state of the science. The development of the plan was led by a committee of 25 active members of the carbon cycle research community, and the result is intended to provide U.S. funding agencies with information on community-based research priorities for carbon cycle science over the next decade.

Climate Change for Forest Policy-Makers

Food and Agriculture Organization of the United Nations

This document is part of the effort by the Forestry Department of FAO to assist countries in integrating climate change considerations into national forest programs. The aim is to assist government officials and stakeholders in preparing the forest sector for the challenges and opportunities posed by climate change. The authors recognize that response to climate change must be considered in the context of the multiple goods and ecosystem services that forests provide to meet the diverse needs of a wide range of stakeholders.

LINKS

Skagit Climate Science

The Skagit Climate Science Consortium (SC2) is a multidisciplinary group of research scientists from federal, state, municipal, tribal, and university and NGOs working in the Skagit basin in northwest Washington State and British Columbia. SC2 is working to understand the climate-related changes occurring in the Skagit basin, the range of changes possible in the future, and how predicted changes

relate to the health and well-being of the community and ecosystem. SC2 members seek to work in partnership with the Skagit community to ensure their research is integrated closely with the concerns and needs of the community and is available and relevant for use by public and private decision makers.

Center for Climate and Energy Solutions

The Pew Center on Global Climate Change is now the Center for Climate and Energy Solutions (C2ES) with a broader base of charitable, corporate, and public support. C2ES promises to continue to provide impartial information and analysis on the scientific, economic, technological, and policy dimensions of climate and energy issues.

SUBMISSIONS

Please send your submissions on Forest Service climate change related activities to Cathy Dowd: cdowd@fs.fed.us. It's most helpful to have a short description with a web link to more information.

Contact information for the Climate Change Advisor's Office is on our Intranet site. Here you will also find materials like the National Roadmap for Responding to Climate Change, the Performance Scorecard, and Scorecard guidance.