Engaging a Climate Ready Agency

From Dave Cleaves, Forest Service Climate Change Advisor

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This update is designed to inform you about Forest Service activities that are linked to climate change as we all work to bring climate change knowledge into our organizational expectations and actions. Please continue to share the details of your climate change related research, management activities, and communications so that we can learn from each other as we work to connect the strong fibers of this vast organization. (See submission details in the last section of this update.)

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

Managing Risk: Key to Climate Change Adaptation

This essay is excerpted from Dave's issue brief on risk management (soon available on our intranet site).

We face multiple risks every day as resource managers. We are pretty good at intuitively understanding the likelihoods of different hazards, the uncertainties around them, and their potential impacts on the resources we value, and we use this understanding in our resource management decisions. But the risks we manage are rapidly changing with the climate. Sustainability can no longer presume stationarity. To sustain the benefits of our forests and grasslands, our risk management approach itself must adapt to changing means and extremes. We may have to become even better at the techniques and principles of risk management. Our experience and intuition will only take us so far in a rapidly changing world.

Risk can be defined as exposure to a chance of loss. Losses can be ecological, social, or economic, expressed in absolute terms or in a sense of failure to reach a goal or a desired condition. The link between exposure and loss is vulnerability, shaped by the likelihood and magnitude of hazards (stressors) and by the sensitivity of resources to stressors and its capacity to cope with and recover from stress. Understanding exposures, vulnerabilities, and losses and taking actions to reduce losses within the limits of financial and organizational capacities is the discipline of risk management. Risk management can allow us to capture opportunities as well as reduce or avoid losses. A stressor event – fire, epidemic, flood, landslide – can create opportunities for transition to more resilient conditions, for retreat from high exposure zones, or for learning to avoid similar losses in other places.

Simply said, but not so simply done. Climate change has brought new wrinkles to risk management. Climate does not act alone. It is a mega-stressor that drives other stressors such as fire, pests, and floods, and interacts with many non-climatic stressors such as land use conversion, invasives introduction and spread, energy development, human recreation, and others. It also couples stressors into more complex and formidable forces on the landscape, creates more complicated pathways for exposure, and stretches the extreme conditions beyond our imagination. If we cannot bring these new realities into our management decisions, we will not fare well on our adaptive journey through a changing climate. As climate interacts with topography, other stressors, and demographic and socio-economic changes, we need to regularly reassess the risk profiles and perhaps readjust our strategies.

Risk management doesn't mean trying to address all risks in all ways, "riding off in all directions," spending money, time, energy, and social capital trying to drive every risk we identify to zero. There is no shortage of risks to manage. But neither does it mean just "hunkering down," waiting to see what happens. No-action can be the riskiest action of all. And it's not a very good way to learn. To learn forward, you have to lean forward. As my grandfather told me, "You can't steer that bicycle unless you get it moving."

Risk management is useful for helping us to decide and to explain how we have decided what not to do as much as what to do. It doesn't make the decisions any easier, but it can help us make tradeoffs and opportunities more clear and guide us to making the highest possible reduction across multiple risks. We will need all the help we can get in sorting through which risks to handle first and how far to go in reducing particular risks.

Risk management is how we are approaching the challenges of adapting to climate change. It allows us to think through how we will anticipate and respond to change. Exposure to climate change occurs as it interacts through and with other hazards and stressors that already affect the resources we care about. Adapting to this risk is not a one-time thing because the risks will always be changing. Adaptation, therefore, is not an endpoint, but a perpetual series of risk-based adjustments – a forward spiral of adaptive risk management cycles.

In adaptive risk management, we heighten the emphasis on changing conditions, never assuming that we have a particular risk "nailed down." We are constantly reassessing the chances and consequences, managing the risks we see coming and preparing to handle the surprises that will inevitably occur despite our most diligent attempts to forecast them.

The adaptation dimension of the climate change scorecard (Elements 6, 7, and 8) is all about adaptive risk management. Assessing vulnerability is the process of identifying and characterizing (a) exposures of key resources and values to interacting climate-driven and non-climate stressors, (b) sensitivity of these resources to this exposure, and (c) the adaptive capacity of the resource to recover after being exposed or to gracefully transition to a new condition. Adaptation actions are risk management adjustments to these vulnerabilities. They may be designed to resist exposure, build resilience (reduce sensitivity or increase adaptive capacity), or facilitate transition with the least harmful disruption of important functions and processes. And monitoring is a focused process to check efficacy of these measures and detect signals of changing conditions that would justify reassessment and readjustments of our actions.

HIGHLIGHTS FROM THE SCORECARD

In this section, we feature the accomplishments by National Forests and Grasslands related to one of the Climate Change Scorecard elements.

Element 6 – Assessing Vulnerability

The **Humboldt-Toiyabe National Forests** (R4) completed an initial Climate Change Vulnerability Report in April 2011. Written by Cheri Howell, an ecologist on the Hum-Toy, and reviewed by Jeanne Chambers of RMRS, the report is posted on the Forests' public Land & Resources Management website. It lists past and current climate change and the coincident biological changes as well as the vulnerabilities of the Hum-Toy's ecosystems and actions that the forests can take to reduce the impact of climate change. The State of Nevada Natural Heritage Program is currently identifying species and habitats most at risk in Nevada, which will help provide more detail for a future draft.

The **Grand Mesa, Uncompahgre and Gunnison National Forests** (R2) participated in the Watershed Vulnerability Assessment (WVA) pilot project through PNW. Their WVA identifies key aquatic resources, characteristics that make them sensitive to climate change impacts, potential climate changes that may occur, and potential impacts to the key resources. Information from the WVA will be used in the vulnerability assessment to be conducted by the Gunnison Basin Climate Change Working Group this year.

FROM THE WASHINGTON OFFICE

Restoration Leadership Forum

Dave Cleaves represented the Forest Service at the Restoration Leadership Forum sponsored by Germany and the International Union for Conservation of Nature in collaboration with the Global Partnership on Forest Landscape Restoration. The purpose of the forum was to catalyze globally significant contributions to meeting the United Nations Framework Convention on Climate Change (UNFCCC) goal on Reducing Emissions from Deforestation and Forest Degradation Plus (REDD+) to slow, halt, and reverse forest cover and carbon loss and the Convention on Biological Diversity target to restore at least 15 percent of degraded ecosystems by 2020. Participants in the forum shared information about tools available to support decision making on and implementation of landscape restoration and their experiences with practical strategies for restoration.

FROM THE FIELD

Climate Change Tree and Bird Atlas Webinar Workshops

NRS developed an on-line Climate Change Atlas about 134 tree and 147 bird species of the eastern U.S. based on models that project how habitat for these species might change with a changing climate. Three separate, but similar workshops, each developed for a different audience, will introduce participants to the content, features, and use of the atlas: Sept. 19, 1:00–3:00 PM ET for US Forest Service employees; Sept. 20, 9:00–11:00 AM ET for natural resource professionals, such as wildlife biologists and foresters; and Sept. 20, 1:00–3:00 PM ET for forest owners, natural resources educators, forest owner or master naturalist volunteers, and Cooperative Extension educators. The two principle goals for this workshop are to make it easier for you to use the atlas in your work and to learn from you how to improve the utility of the atlas. Register on-line any time prior to the day of the webinar at www.arnotconservation.info and click on “Events.”

RMRS and Lolo National Forest Co-Sponsored Biochar Symposium

“Biomass to Biochar: What are the Possibilities?” was developed and organized by Dan McCollum of RMRS and sponsored by the Lolo National Forest, RMRS, Tricon Timber, and Mineral County, Montana. The Symposium focused on biochar and its potential for creating value-added products derived from woody biomass, in particular the residual materials from forest treatment projects and timber mill operations. Presentations and panel discussions covered forest restoration needs, emerging uses of biochar, industry opportunities and supply-side challenges, research gaps, and next steps. RMRS presenters included Dan McCollum, Greg Jones, Nate Anderson, Cindy Swanson, and Debbie Page-Dumroese. A full list of speakers and their presentations is online.

Climate Change Scorecard Jeopardy!

Holly Ennist and Carol Howe came up with a fun way for the Grand Mesa, Uncompahgre and Gunnison National Forests FLT to learn about the climate change scorecard and their forests' accomplishments. Questions and answers based on scorecard elements and the narratives the forest developed for the preliminary assessment were entered into an interactive Jeopardy board in PowerPoint. Points were awarded for correct answers and the winning team received prizes. Carol filed their Jeopardy board on the O drive so you can copy and customize for your forest.

RMRS Grassland, Shrubland, and Desert Update

The RMRS Grassland, Shrubland and Desert Ecosystem Science Program (GSD) has developed a new research review - *GSD Update* - prepared in an easy-to-read format. Check out the first issue, which focused on climate change. The September issue is on invasive species research. Plans are to initially cover GSD research in their 5 focal areas: climate change, invasive species, disturbance, restoration, and ecosystem sustainability and management.

OTHER EVENTS AND OPPORTUNITIES

Climate Solutions University

The Model Forest Policy Program has a Climate Solutions University that is designed to train small communities/counties on preparing climate change adaptation plans. They select 5-10 new communities each year and have a few funders looking for communities in particular areas: Great Lakes, ID, WA, OR, WY, MT or SE Alaska. Program guidelines and applications are available at their website. Applications are due September 19, 2011. You can also sign up for their Climate Planners' Newsletter at their website to receive news, resources, and opportunities for climate adaptation.

Addressing Cumulative Effects, Climate Change, and Adaptive Management in NEPA Analysis Course

This three day course, October 11-13 at the National Conservation Training Center in Shepardstown, WV, will focus on how the requirement to analyze cumulative effects under NEPA may be used to address the impacts of proposed Federal actions on climate change, and, conversely, the effects of climate change on proposed Federal action. Information and resources addressing climate change in the foreseeable future will be presented. Participants will gain applicable knowledge about monitoring, mitigation, and adaptive management in the context of NEPA. This course is for personnel whose job responsibilities include ensuring their agency is in compliance with NEPA, either writing and/or reviewing NEPA documents. Participants are expected to have attended an introductory NEPA class and have three years of NEPA experience, or to have five years of NEPA experience. Non-DOI participants should contact Brenda Hooper at 304/876-7449 or Brenda_hooper@fws.gov.

Climate Change Under NEPA Training Course

This course, sponsored by CEQ, provides NEPA practitioners with the most up-to-date primer on how to incorporate climate change consideration in a NEPA context. Topics covered include: climate change science, the latest policy and legislative developments, and NEPA climate change case law review and update. In addition, the course addresses climate change in a cumulative effects framework; the environmental, social, and economic effects of climate change; and the distinction between climate change effects caused by projects, versus climate change effects onto proposed

actions and other resources affected by a proposed action. Furthermore, the course looks into the strategies for integrating climate change analyses into NEPA documents, how to determine significance for climate change impacts and climate change mitigation and adaptation. Participants are exposed to numerous examples of NEPA climate change analyses and have the opportunity to critically review case studies and NEPA documents that address climate change-related issues. This course will be offered November 16-18, 2011 in Durham, NC, by the Duke Environmental Leadership Program. More information is available here.

CLIMATE CHANGE RESOURCE CENTER (CCRC)

Climate Change in Aquatic Ecosystems

The CCRC recently published a video series titled Understanding & Adapting to Climate Change in Aquatic Ecosystems at Landscape and River Basin Scales. This series features presentations from a workshop that was held to discuss the management implications of climate change on aquatic ecosystems, utility of existing tools, and future information and analysis needs. Online presentations from subject experts focus on current information regarding the effects of climate change on aquatic ecosystems, and analysis tools that could assist managers in addressing climate change.

RECOMMENDED READING

Climate Change and Forest Biodiversity: A Vulnerability Assessment and Action Plan for National Forests in Western Washington

Carol Aubry, Warren DeVine, Robin Shoal, Andy Bower, Jeanne Miller, and Nicole Maggiulli

The goals of this analysis were to assess the vulnerability of forest tree species and non-forested habitats to climate change and propose practical management actions that will work under a variety of future climate scenarios and can be implemented by the national forests in western Washington in cooperation with other land managers. Topics include: distribution maps and a synopsis of ecological and genetic information on 34 forest tree species, comparison of vulnerability assessment methods, forest tree species vulnerability assessment, non-forested habitats assessment, role of species distribution models in vulnerability assessments, vegetation management options including assisted migration, monitoring climate effects on trees, gene conservation, and recommendations and action items for each national forest. This report is online at the Ecoshare website or can be ordered through Carol Aubry, caubry@fs.fed.us.

Social Vulnerability and Climate Change: Synthesis of Literature

Kathy Lynn, Katherine MacKendrick, and Ellen M. Donoghue

The effects of climate change are expected to be more severe for some segments of society than others because of geographic location, the degree of association with climate-sensitive environments, and unique cultural, economic, or political characteristics of particular landscapes and human populations. Social vulnerability and equity in the context of climate change are important because some populations may have less capacity to prepare for, respond to, and recover from climate-related hazards and effects. Through this synthesis, social vulnerability, equity, and climate justice are defined and described, and key issues, themes, and considerations that pertain to the effects of climate change on socially vulnerable populations are identified. The synthesis reviews what available science says about social vulnerability and climate change and documents the emergence of issues not currently addressed in academic literature. In so doing, the synthesis identifies knowledge gaps and questions for future research.

Extreme Weather and Climate Change: Understanding the Link, Managing the Risk

Daniel G. Huber and Jay Gulledge, Pew Center on Global Climate Change

This white paper contends that the uncertainty about future weather conditions and the inability to attribute single events to global warming need not stand in the way of action to manage the rising risks associated with extreme weather. An effective risk management framework accommodates uncertainty, takes advantage of learning opportunities to update understanding of risk, and probes today's rare extreme events for useful information about how we should respond to rising risk. Risk management eschews futile attempts to forecast individual chaotic events and focuses on establishing long-term risk certainty; that is, an understanding of what types of risks are increasing and should be managed to minimize future costs. An understanding of the meaning of risk and how it relates to changes in the climate system is crucial to assessing vulnerability and planning for a future characterized by rising risk.

LINKS

Climate Change Scorecard

The CCRC has completed a new website for the Scorecard that links each element to available resources. Kristen Schmitt and Leslie Brandt of the Northern Institute of Applied Climate Science, Sarah Hines of the Northern Area/Northern Research Station, Cathy Dowd of the WO Climate Change Office, and Jeffrey Guntle of Pacific Northwest Research Station gathered and organized this information into a user-friendly format. The website also highlights examples of what Forests are doing for each Scorecard element – these examples were drawn from the preliminary assessments and will be updated with new examples once the results of the FY2011 Scorecard are in.

Climate Wisconsin: Stories from a state of change

Climate Wisconsin is an educational multimedia project featuring stories from a rapidly changing state. All stories are supported by research conducted in collaboration with the Wisconsin Initiative on Climate Change Impacts and cover forestry, fly and ice fishing, skiing, maple syrup production and more.

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.